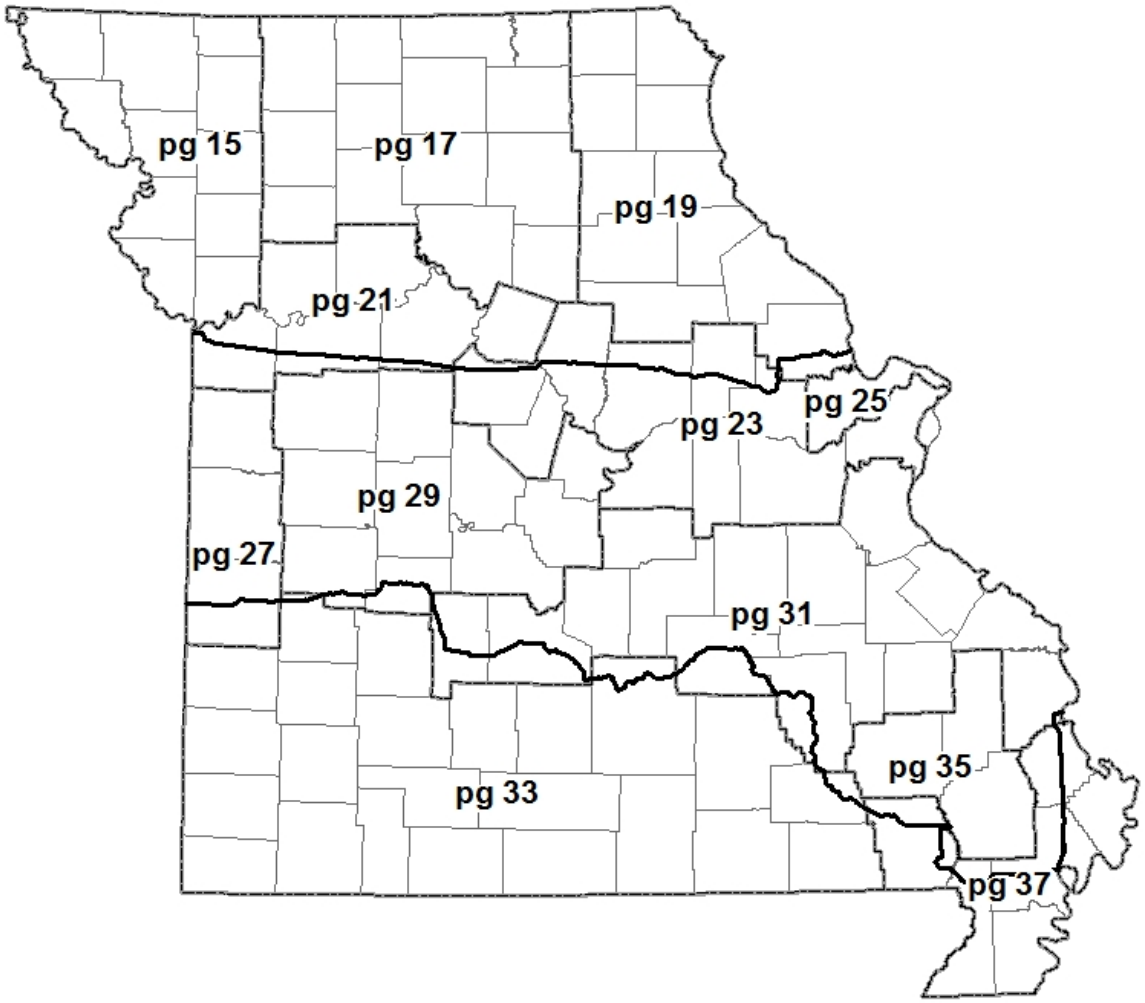
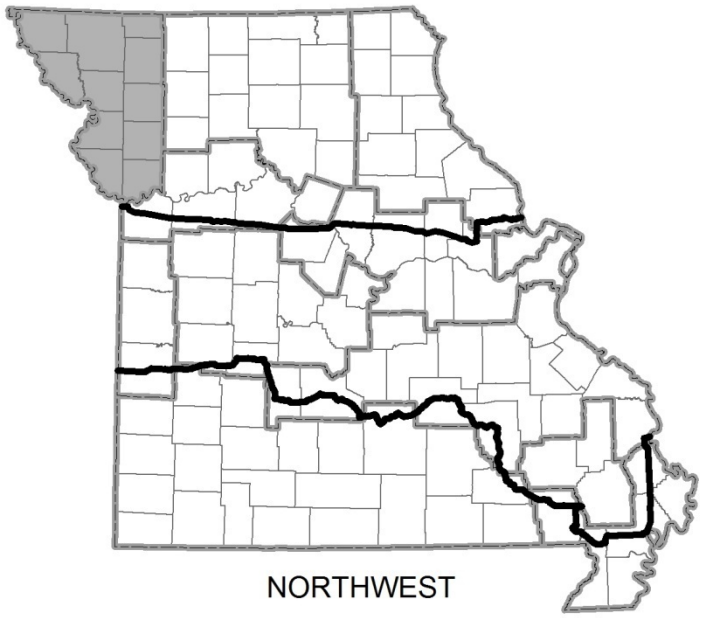
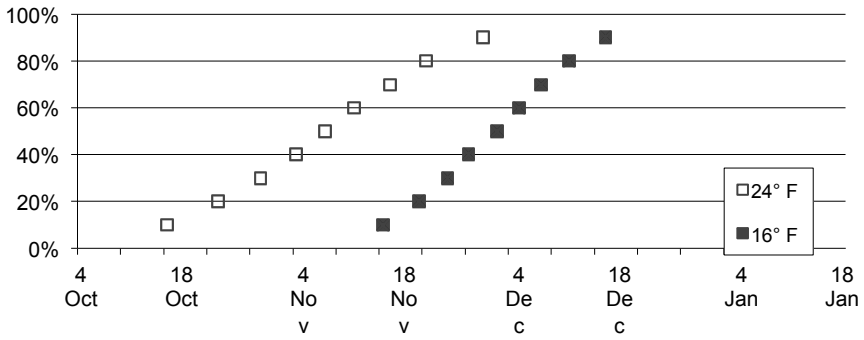
WEATHER, POPULATION, AND HARVEST TRENDS IN 12 REGIONS OF MISSOURI



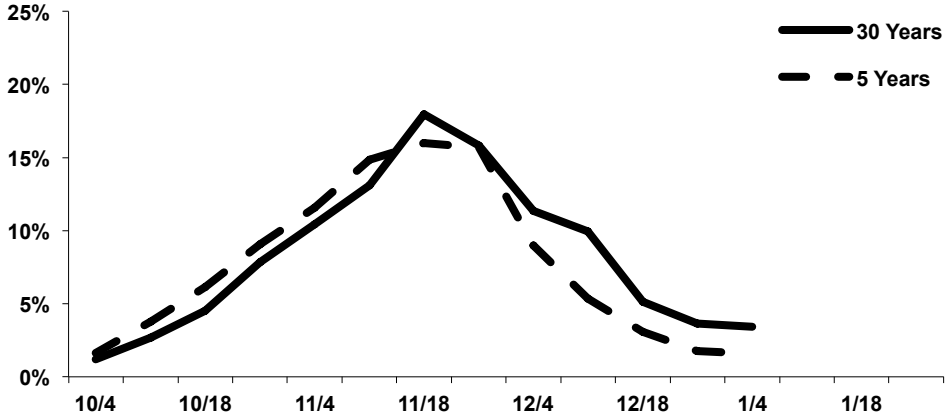
NORTHWEST: In Northwest Missouri, precipitation gradually declines from late summer through fall. Average low temperatures fall below freezing by mid-November. There is a 50% probability of achieving a low temperature of 24° F by November 7. By December 1, there is a 50% chance of a low temperature of 16° F and a 90% chance of 16° F by December 16. The pattern of duck use at Squaw Creek NWR, Bob Brown CA, and Nodaway Valley CA exhibits a gradual buildup through mid-November and a slightly sharper decline during late November and December. Peak numbers occurred at about the same time during 2006-2010 compared to the 30-year average. Early migrants use typically peaks during mid to late October and declines through November. Mallard numbers peak during mid to late November and decline through December as ice conditions develop.



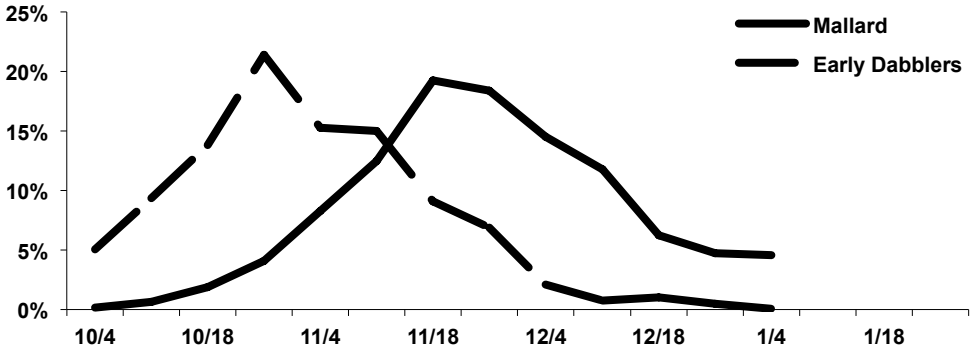
Probability (%) that a temperature of 24° F and 16° F will be reached by date at Oregon, MO.



Percent of duck use by week (Squaw Creek NWR, Bob Brown CA, and Nodaway Valley CA): 30- year average and 5-year average.

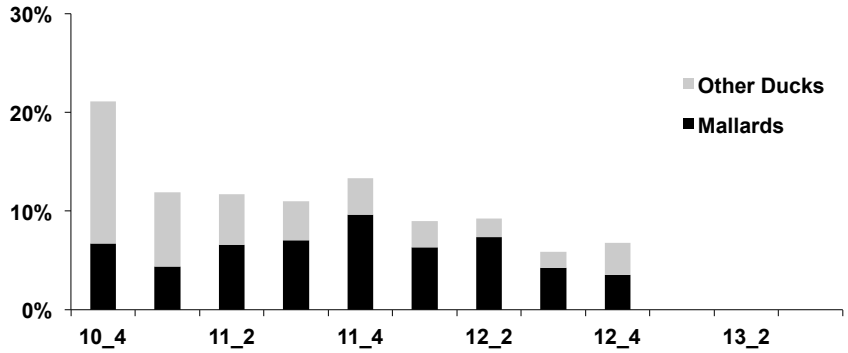


Percent of mallard and early migrant use by week (Squaw Creek NWR, Bob Brown CA and Nodaway Valley CA): 30-year average.

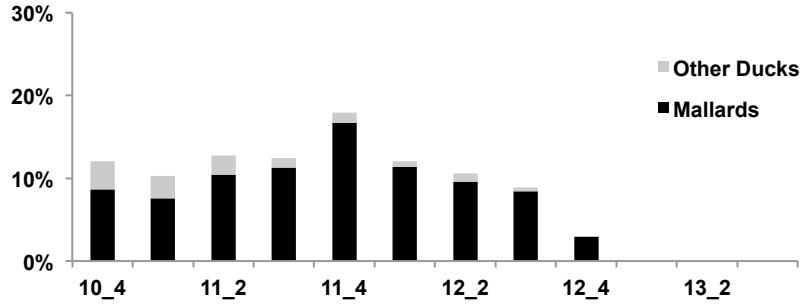


NORTHWEST HARVEST: The Northwest Region accounted for 8% of the U.S. Fish and Wildlife (FWS) statewide harvest estimate and 8% of statewide duck band recoveries during 1997-2009. FWS harvest estimates suggest that the highest harvest, 21% of the season total, occurs during the last week of October. Harvest composition includes 67% early season migrants and 33% mallards during the last week of October. A second peak occurs during the last week of November when 14% of the season total is harvested. Of the ducks harvested during the last week of November, 29% include early season migrants and 79% mallards. Band recoveries were fairly consistent through the entire season with a peak in late November. Average daily harvest over the past 10 years at Bob Brown CA and Nodaway Valley CA remained stable until the last 3 weeks of the season. In cold years, this region has the potential to freeze early and limit harvest opportunity. Over the past four years, both Bob Brown CA and Nodaway Valley CA have lost an average of 19 days to icy conditions as shallow water habitats were frozen by early December. This occurred in 2009 (cold fall) when hunting on most shallow water habitat ended on December 6th due to ice. However, in the event of a mild winter as occurred in 2001 (warm fall), hunter trips and harvest are maintained through late season when open water remains available.

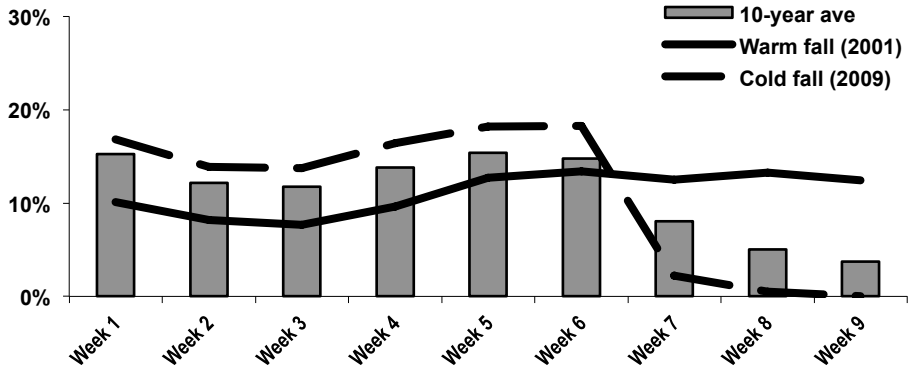
Average daily harvest per week in the Northwest Region based on FWS harvest estimates: 1997-2009.



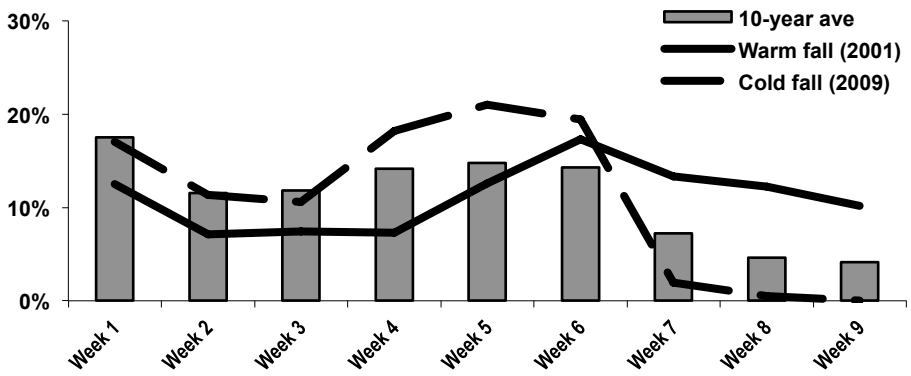
Average daily band recoveries per week in the Northwest Region: 1997-2009 (n=705).



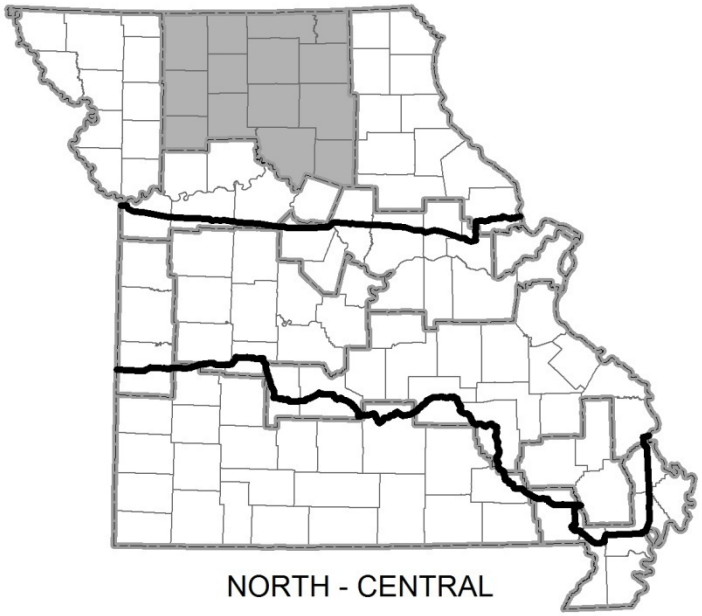
Percent of CA daily hunter trips by week of season at Bob Brown CA and Nodaway Valley CA: 2000-2009.



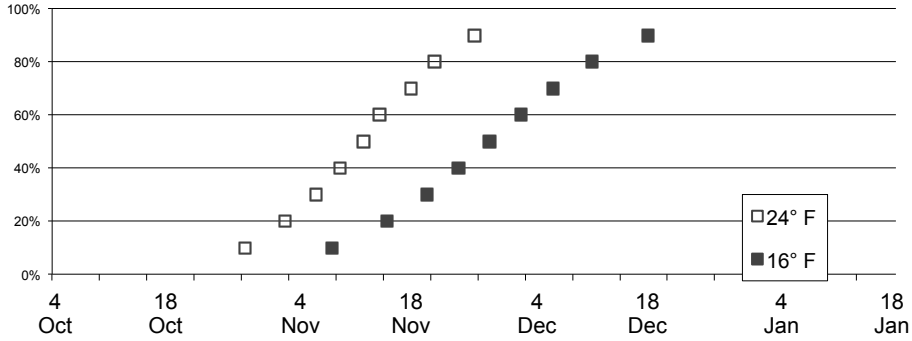
Percent of CA daily harvest by week of season at Bob Brown CA and Nodaway Valley CA: 2000-2009.



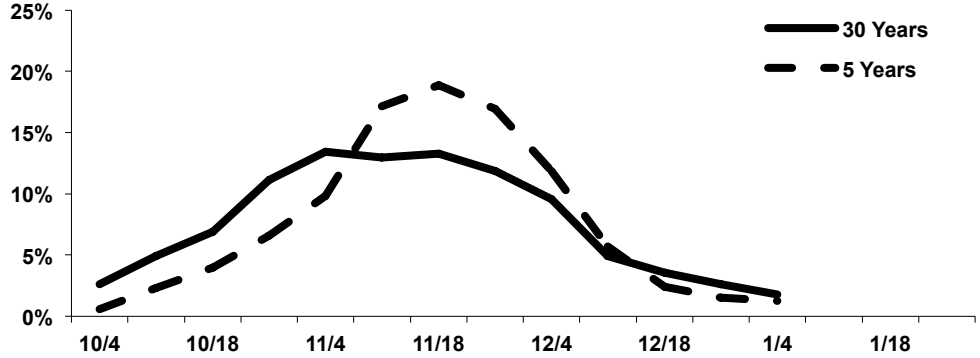
NORTH-CENTRAL: Precipitation patterns in North-Central Missouri, although somewhat wetter, are similar to Northwest Missouri with gradual declines after September. Freezing conditions initially occur during mid-November and there is a 50% probability for a low temperature of 24° F occurring by November 12. By December 2 there is a 50% chance of a low temperature of 16° F. Duck use at Fountain Grove CA and Swan Lake NWR typically peak in late November. During the past five years, peak numbers have been higher than compared to the 30-year average and slightly later. Timing of departure has remained essentially unchanged. Late October weather fronts that bring early mallard flights often result in declining numbers of early season migrants such as green-winged teal, pintail and wigeon.



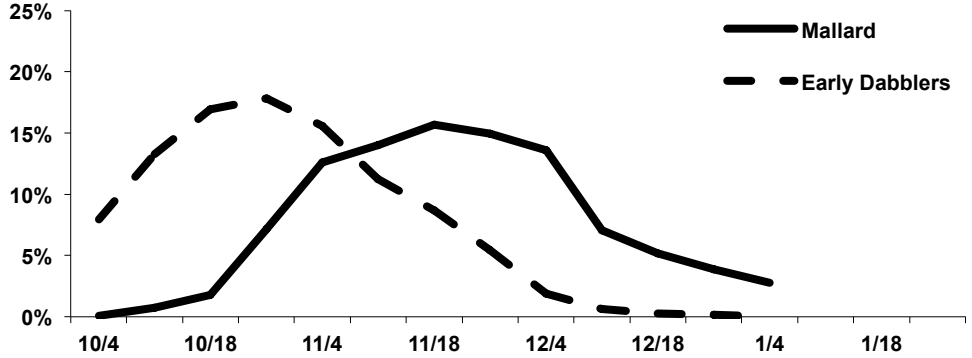
Probability (%) that a temperature of 24° F and 16° F will be reached by date at Brookfield, MO.



Percent of duck use by week (Fountain Grove CA and Swan Lake NWR): 30-year average and 5-year average.

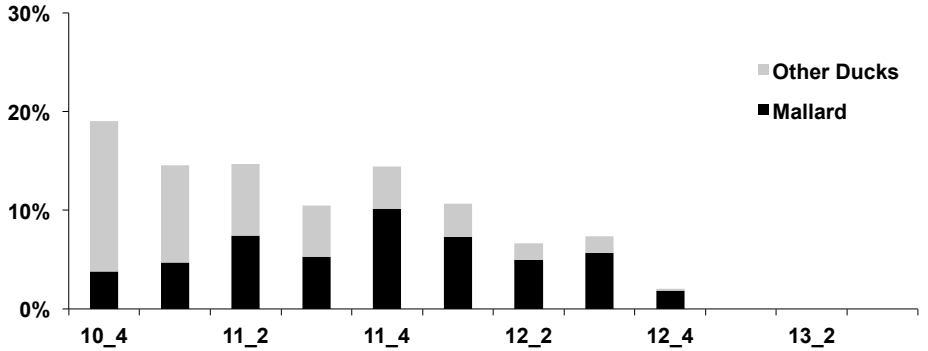


Percent of mallard and early migrant use by week (Fountain Grove and Swan Lake NWR): 30-year average.

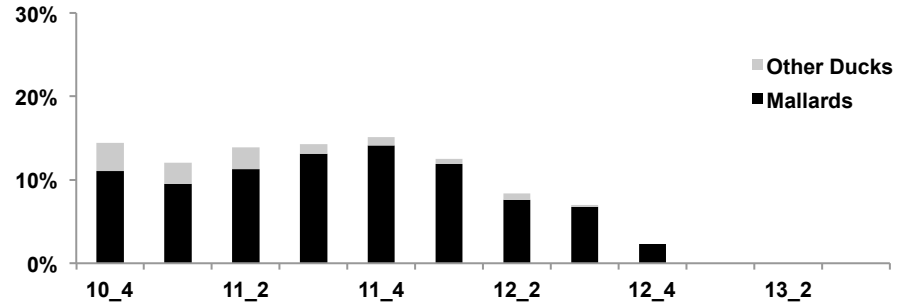


NORTH-CENTRAL HARVEST: This region accounted for 13% of the statewide FWS harvest estimate and 8% of statewide band recoveries during 1997-2009. Harvest estimates indicate that the highest portion of harvest occurs early in the season. Hunters harvested nearly 20% of the season total during the last week of October. Of the ducks harvested during this week, early migrants comprised nearly 80% and mallards just over 20%. A second peak occurs in late November. Hunters harvested 14% of the season total during the last week of November and by this time the bag was primarily mallards (71% vs. 29% other duck species). Band recovery estimates indicate harvest remains fairly consistent throughout November with harvest peaking during the last week of November. By mid-December harvest begins to decline. At Fountain Grove, the average number of daily hunter trips per week and harvest also declines by mid-December as shallow water habitat begins to freeze. In the past four years, shallow water in this region is often frozen by mid-December. To illustrate, Fountain Grove has been ice-covered for an average of 17 days over the past four years. However, hunter trips and harvest are maintained through late season during mild winters when open water remains available.

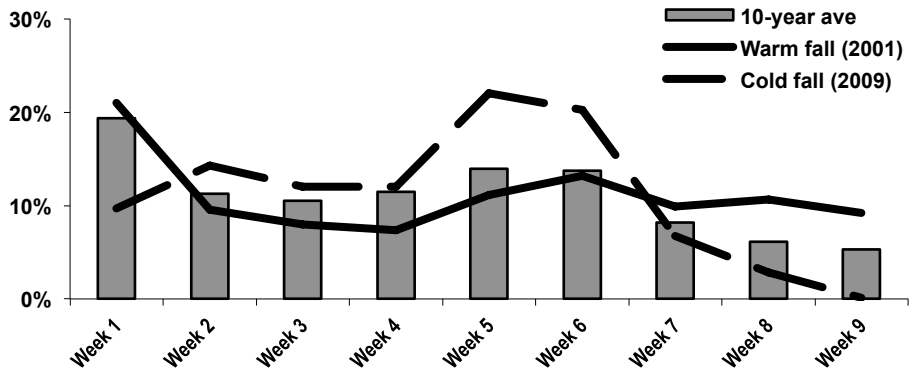
Average daily harvest per week in the North-Central Region based on FWS harvest estimates: 1997-2009.



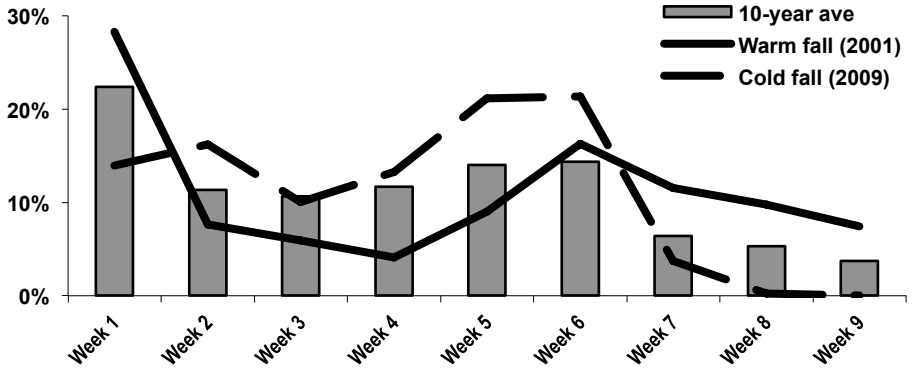
Average daily band recoveries per week in the North-Central Region: 1997-2009 (n=685).



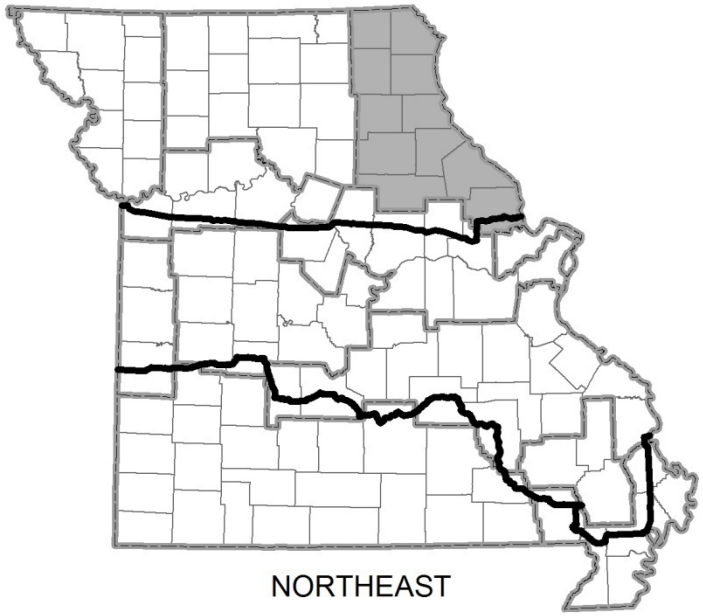
Percent of CA daily hunter trips by week of season at Fountain Grove CA: 2000-2009.



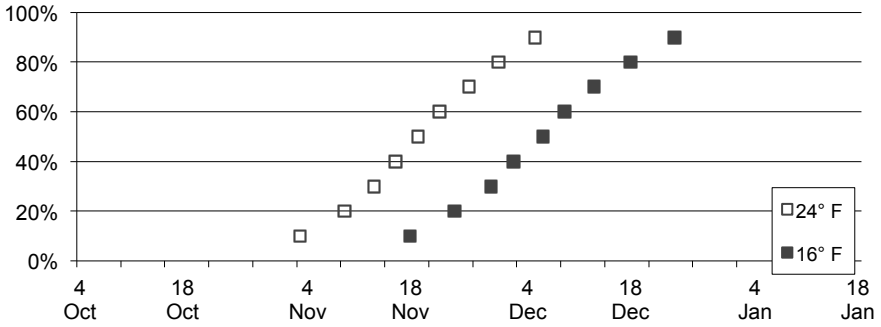
Percent of CA daily harvest by week of season at Fountain Grove CA: 2000-2009.



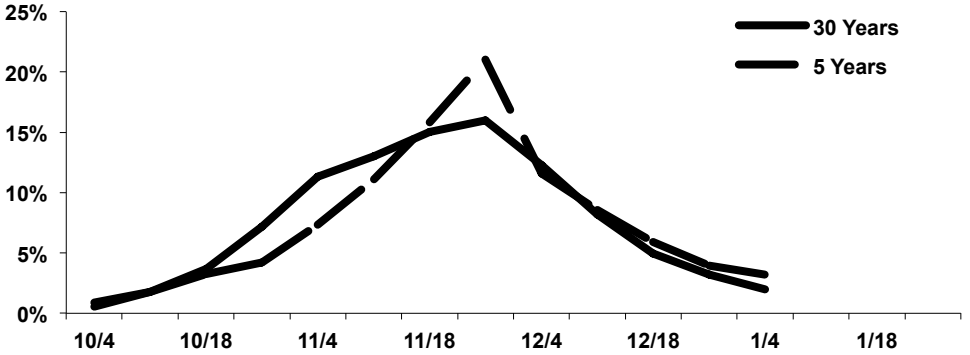
NORTHEAST: Similar to the rest of North Missouri, precipitation gradually declines throughout the fall and early winter, although not as dramatically as in the Northwest. Freezing conditions do not consistently occur until early December. There is a 50% probability of seeing a low temperature of 24° F by November 19, over a week later than in the Northwest. By December 6 there is a 50% chance of seeing a minimum temperature of 16° F. During the past four years, Ted Shanks CA has been frozen-up for an average of 14 days of the duck season. Although the timing of duck use peak is similar between the short-term and long-term averages, during the past five years, duck use increased more sharply and peaked at a higher number compared to the long-term average. Both averages exhibit a similar decline in duck use by early to mid December. Early migrant influx is not as pronounced as in Northwest and North Central Missouri. Mallard use drops off fairly dramatically during mid-December.



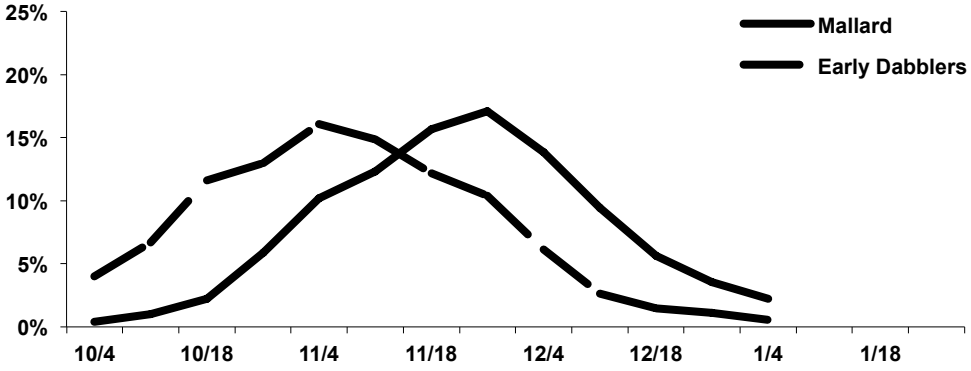
Probability (%) that a temperature of 24° F and 16° F will be reached by date at Saverton, MO.



Percent of duck use by week (Ted Shanks CA): 30- year average and 5-year average.

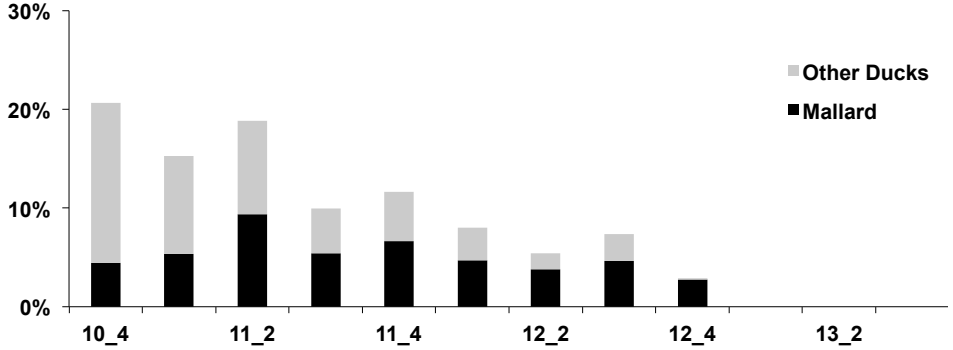


Percent of mallard and early migrant use by week (Ted Shanks CA): 30-year average.

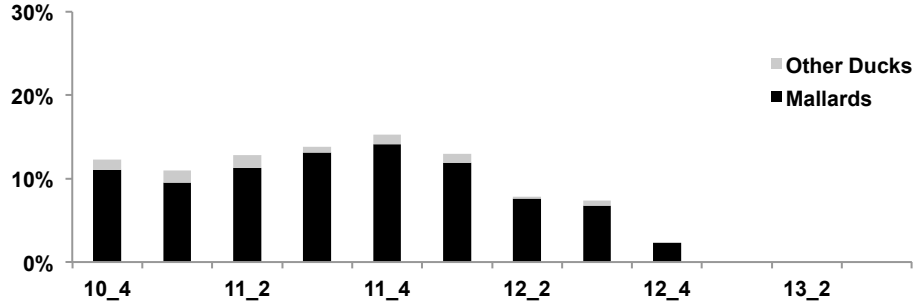


NORTHEAST HARVEST: This region accounted for 13% of the statewide FWS harvest estimate and 9% of statewide band recoveries from 1997-2009. The timing of harvest follows a similar pattern as in North-Central and Northwest Missouri with the greatest proportion of the harvest occurring during early season and declining harvest levels during late season with the onset of freeze-up. For example, hunters harvested slightly more than 20% of the season total during the last week of October and just less than 20% during the second week of November. Early season migrants comprised 80% of the weekly harvest during the last week of October; however, by the second week of November the bag was nearly 50% mallard and 50% other species of ducks. The potential for late season "boom or bust" hunting is present through all of North Missouri. For example, in 2009 harvest peaked during the first week of December at Ted Shanks CA then declined dramatically as wetlands froze. In 2001, a much milder year, harvest was maintained through December and exceeded that experienced in November.

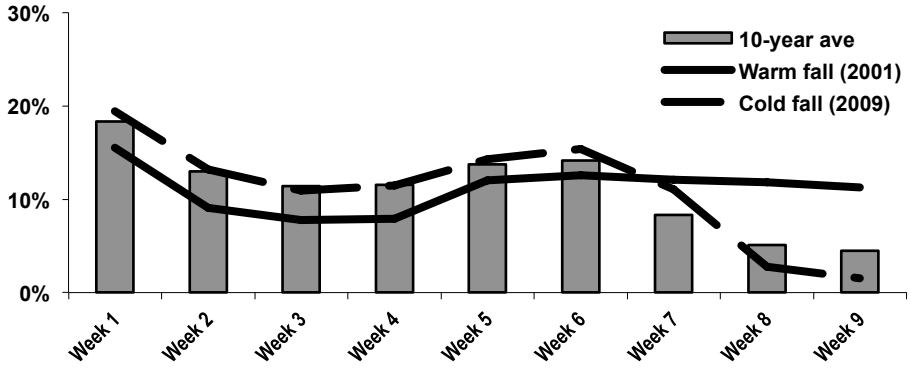
Average daily harvest per week in the Northeast Region based on FWS harvest estimates: 1997-2009.



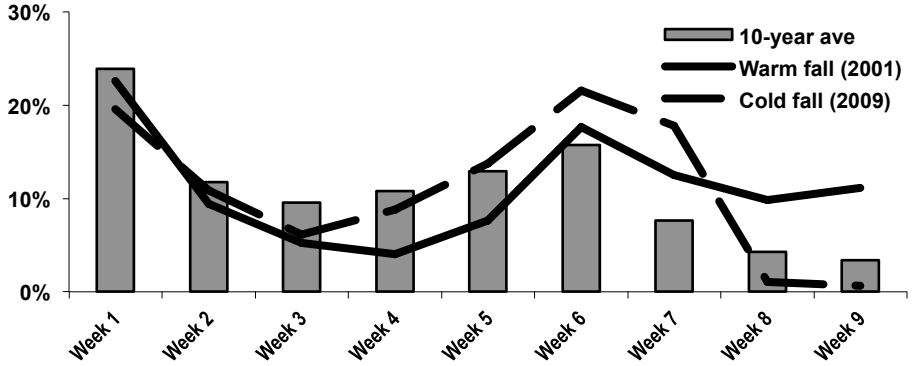
Average daily band recoveries per week in the Northeast Region: 1997-2009 (n=765).



Percent of CA daily hunter trips by week of season at Ted Shanks CA: 2000-2009.

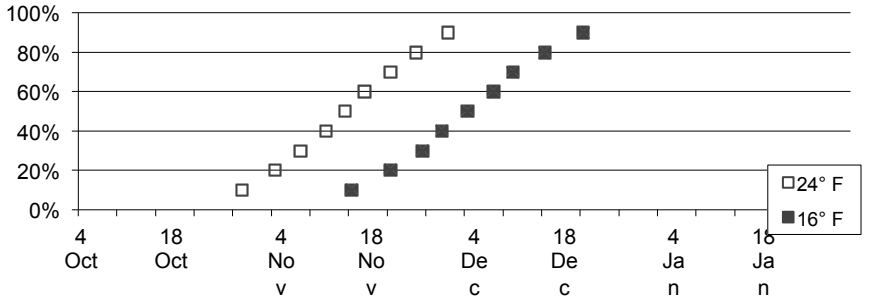


Percent of CA daily harvest by week of season at Ted Shanks CA: 2000-2009.

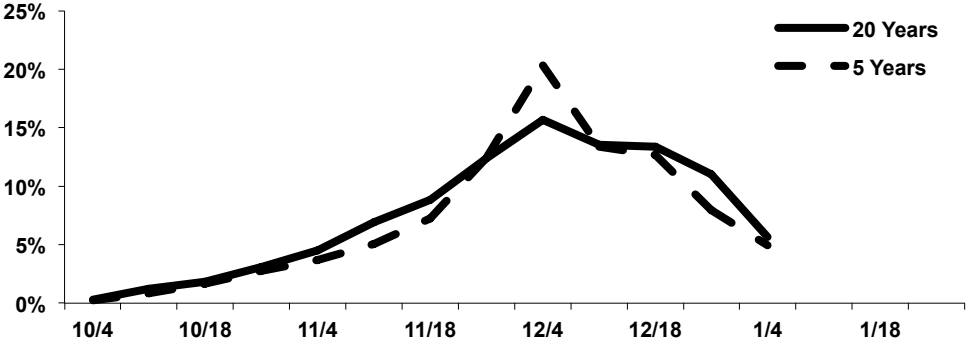


MISSOURI RIVER WEST: Precipitation patterns in the Missouri River West Region are similar to Northwest Missouri, only greater in magnitude. On average, freezing conditions occur a few days later than in the Northwest and a few days earlier than in the Northeast. There is a 50% probability of seeing a low temperature of 24° F by November 14, and by December 3 there is a 50% chance of seeing a minimum temperature of 16° F. During the past four years, Grand Pass CA has averaged nearly 18 days of the duck season where the area is ice covered. Peak duck use is higher for the 5-year average as compared to the 20-year average although timing of the peaks is similar. Late season use associated with Grand Pass CA is apparent in the Missouri River West Region. As expected, use during December is primarily by mallards.

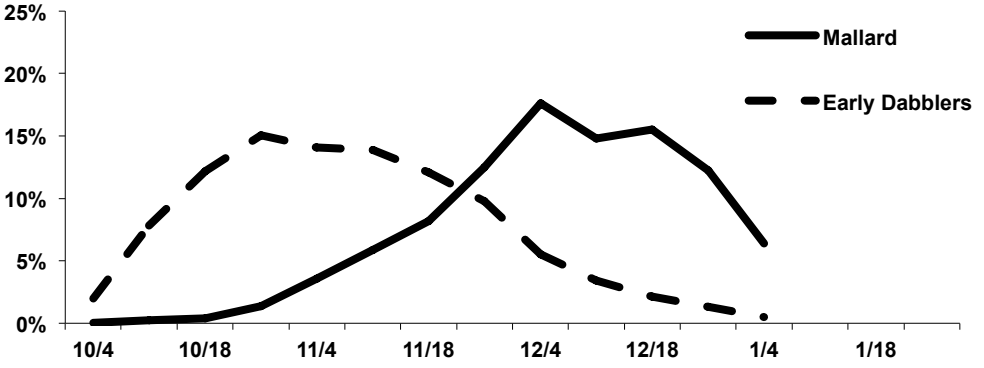
Probability (%) that a temperature of 24° F and 16° F will be reached by date at Marshall, MO.



Percent of duck use by week (Grand Pass CA): 20- year average and 5-year average.

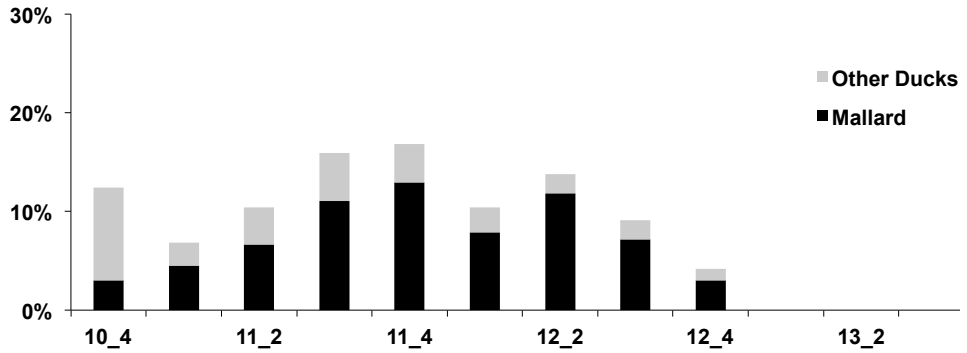


Percent of mallard and early migrant use by week (Grand Pass CA): 20-year average.

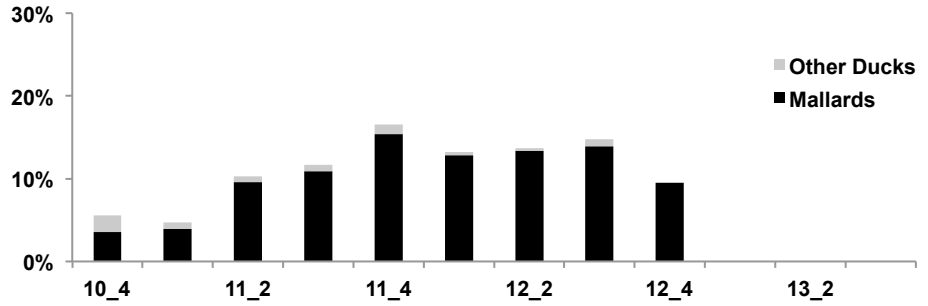


MISSOURI RIVER WEST HARVEST: This region accounted for 7% of the statewide FWS harvest estimate and 9% of statewide band recoveries from 1997-2009. Although there is a modest peak in harvest the last week of October, harvest in the Missouri River West region generally peaks in late November and early December as indicated by both the FWS harvest estimate and band recoveries. Based on FWS estimates, 32% of the 1997-2009 harvest occurred during the last two weeks in November. Early migrants comprised 75% of the weekly harvest in late October and by the fourth week of November harvest composition shifted to 77% mallards. Harvest at Grand Pass followed this same general pattern; however, while harvest declines at Grand Pass due to ice conditions, harvest in deep water habitat and surrounding crop fields likely continues into late season. Harvest levels are maintained in mild years as illustrated by harvest in 2001.

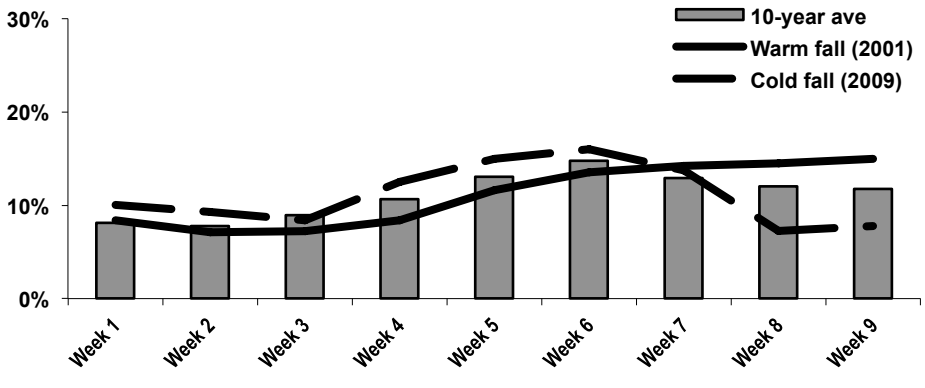
Average daily harvest per week in the Missouri River West Region based on FWS harvest estimates: 1997-2009.



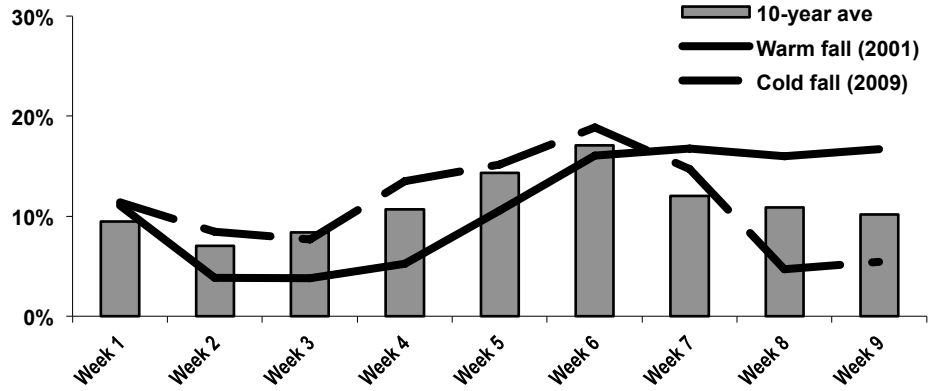
Average daily band recoveries per week in the Missouri River West Region: 1997-2009 (n=770).



Percent of CA daily hunter trips by week of season at Grand Pass CA: 2000-2009.

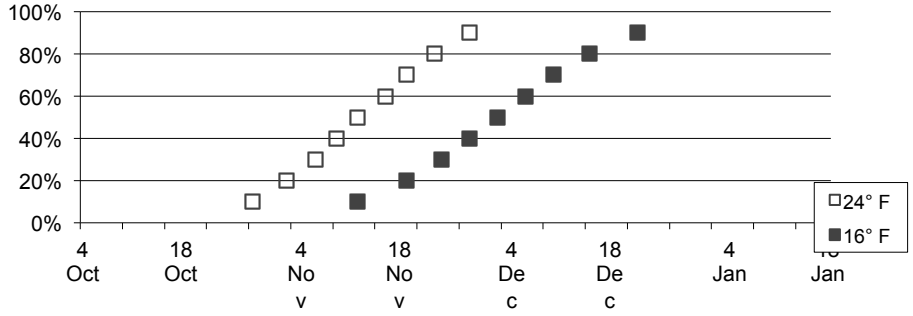


Percent of CA daily harvest by week of season at Grand Pass CA: 2000-2009.

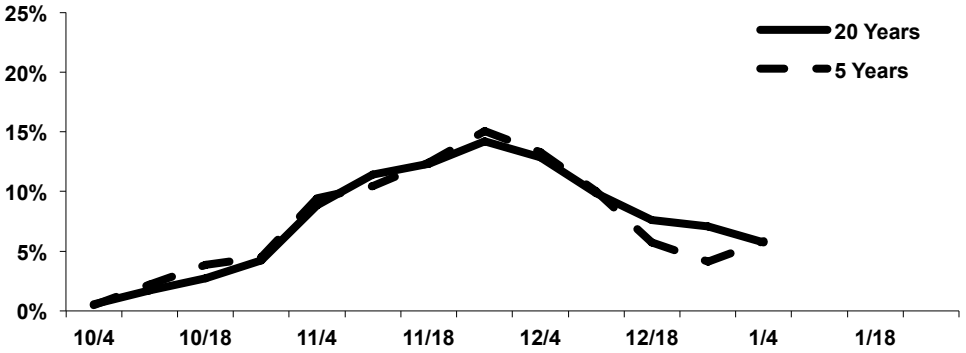


MISSOURI RIVER EAST: Precipitation patterns in the Missouri River East Region are similar to those found in the Missouri River West Region. On average, freezing conditions occur a few days later than in the Northwest and a few days earlier than in the Northeast. There is a 50% probability of seeing a low temperature of 24° F by November 12, and by December 2 there is a 50% chance of seeing a minimum temperature of 16° F. Because this region is mainly in the Middle Zone, shallow water hunters have lost more days to freeze-up than hunters in Missouri River West Region. Over the past five years, Eagle Bluffs has been frozen up for an average of nearly 20 days each season. As expected, use during December is primarily by mallards.

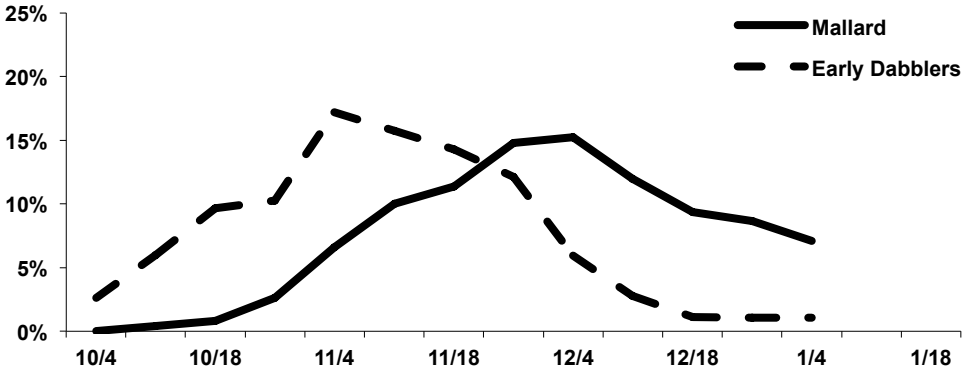
Probability (%) that a temperature of 24° F and 16° F will be reached by date at Columbia, MO.



Percent of duck use by week (Eagle Bluffs CA): 20- year average and 5-year average.

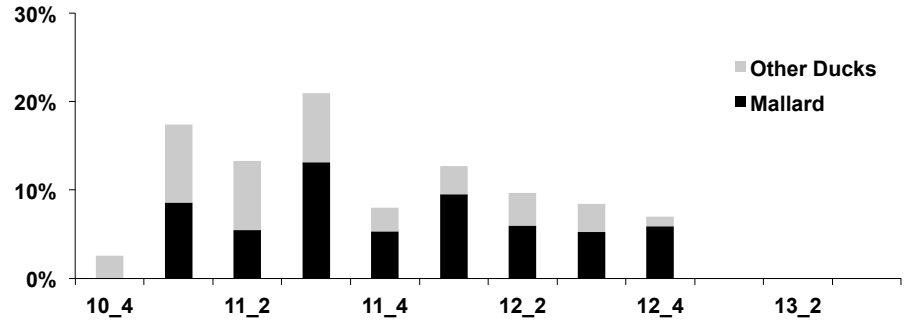


Percent of mallard and early migrant use by week (Eagle Bluffs CA): 20-year average.

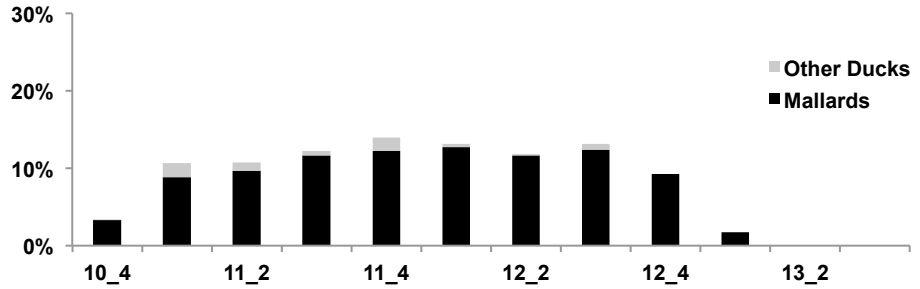


MISSOURI RIVER EAST HARVEST: This region accounted for 3% of the statewide FWS harvest estimate and 6% of statewide band recoveries from 1997-2009. Harvest in the Missouri River East region generally peaks in mid- to late November as indicated by both the FWS estimate and band recoveries. A decline in harvest last season is likely associated with freeze-up. Harvest at Eagle Bluffs follows this same general pattern as illustrated by the sharp, late-season decline in harvest during 2009, a harsh winter, whereas late-season harvest remained steady during 2001, a mild winter.

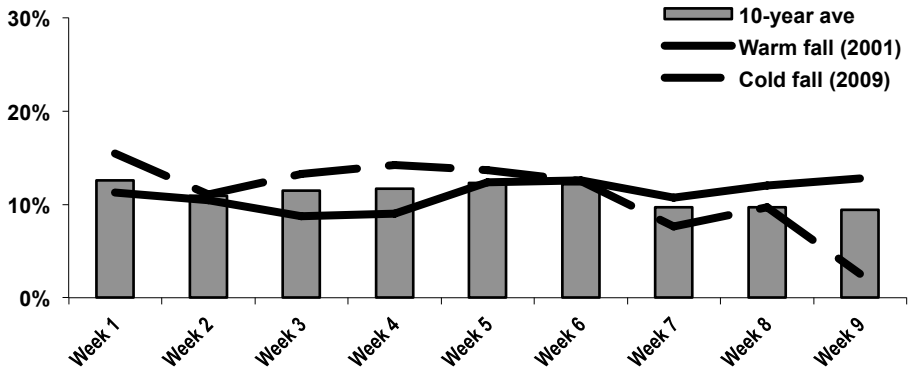
Average daily harvest per week in the Missouri River East Region based on FWS harvest estimates: 1997-2009.



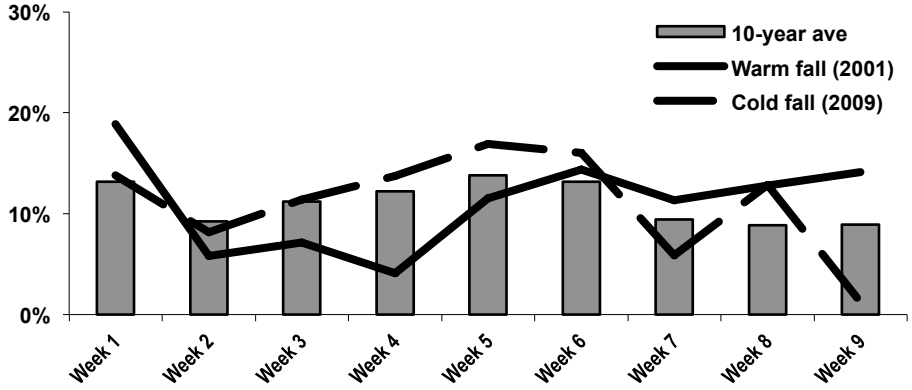
Average daily band recoveries per week in the Missouri River East Region: 1997-2009 (n=467).



Percent of CA daily hunter trips by week of season at Eagle Bluffs CA: 2000-2009.

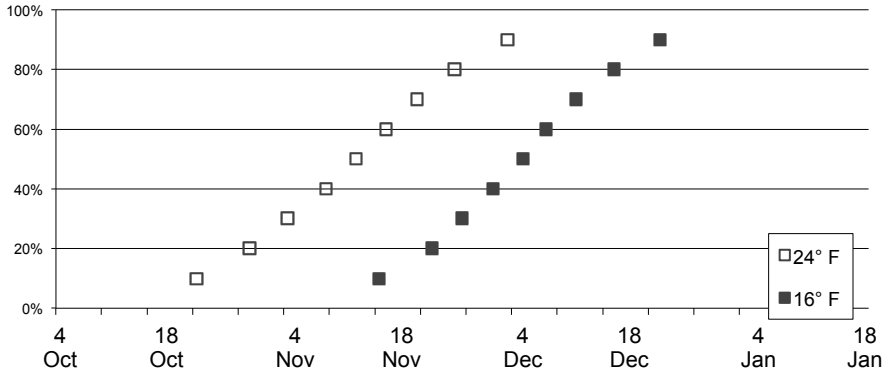


Percent of CA daily harvest by week of season at Eagle Bluffs CA: 2000-2009.

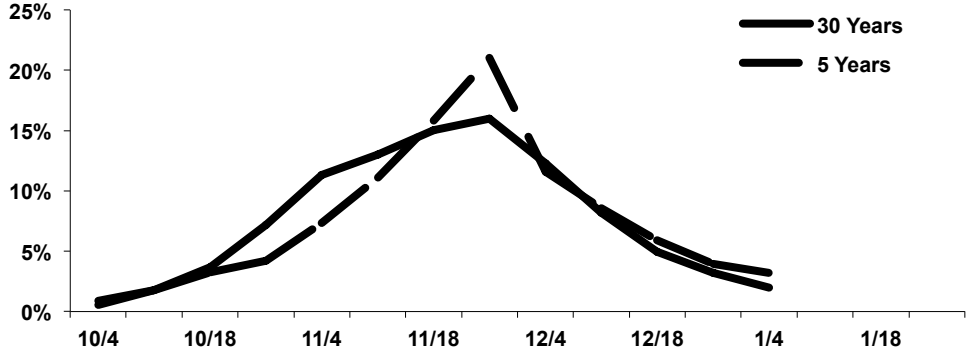


ST. CHARLES COUNTY: As in the rest of North Missouri, precipitation gradually declines throughout the fall and early winter. On average freezing conditions occur a few days later than Northwest Missouri. The 50% probability of seeing a low temperature of 24° F occurs by November 12, and by December 4 there is a 50% chance of seeing a minimum temperature of 16° F. During the past four years, B.K. Leach CA has been frozen for an average of nearly 15 days of each season. Duck numbers at B.K. Leach CA and Marais Temps Clair CA peak from late November through early December, although the five-year average indicates duck numbers have built up more sharply and peaked at a higher number than the long-term average. The peak for early migrants occurs in late October and early November.

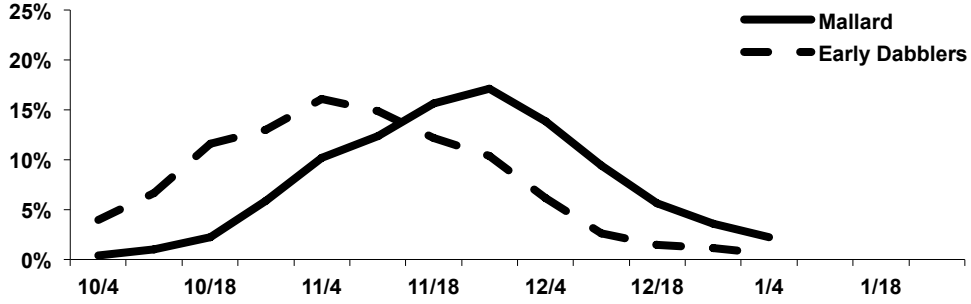
Probability (%) that a temperature of 24° F and 16° F will be reached by date at St. Charles, MO.



Percent of duck use by week (B.K. Leach CA and Marais Temps Clair CA): 30-year average and 5-year average.

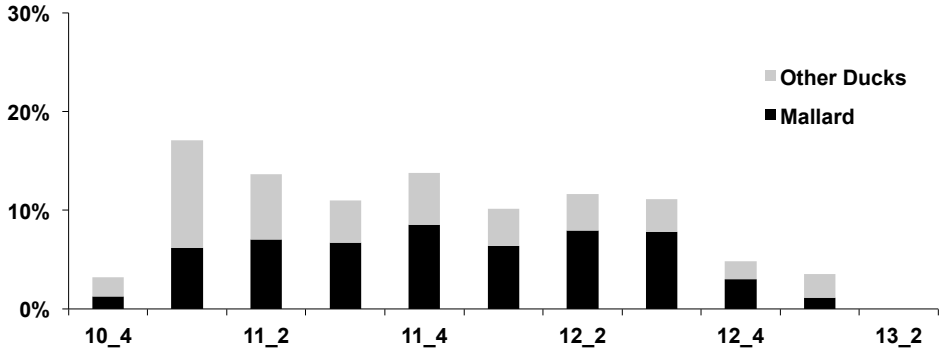


Percent of mallard and early migrant use by week (B.K. Leach CA nd Marais Temps Clair CA): 30-year average.

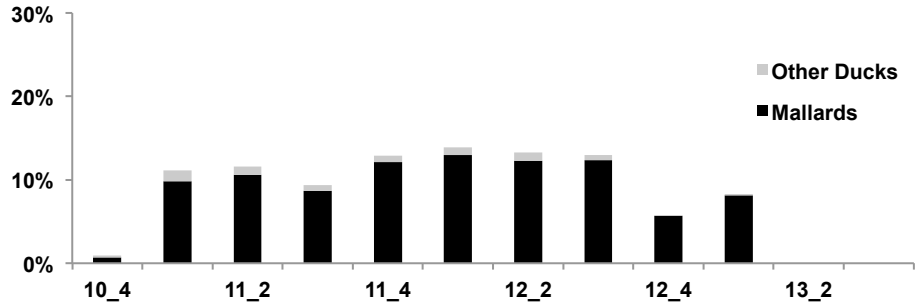


ST. CHARLES COUNTY HARVEST: Although this region includes only one county, it still accounted for 13% of the statewide FWS harvest estimate and 11% of statewide band recoveries during 1997-2009. Both the FWS harvest and band recovery estimates indicate harvest is relatively consistent through November and early December. Mallards comprised 35% and early dabblers comprised 65% of the harvest that occurred during the first week of November. Mallards accounted for 64% and early season dabblers 36% of the harvest that occurred during the last week of November. Hunting in shallow water habitat as reflected by harvest at B.K. Leach typically declines by mid-December. Band recoveries and FWS harvest estimates indicate that late season harvest also occurs as duck use shifts from shallow water habitat to remaining open water during late season.

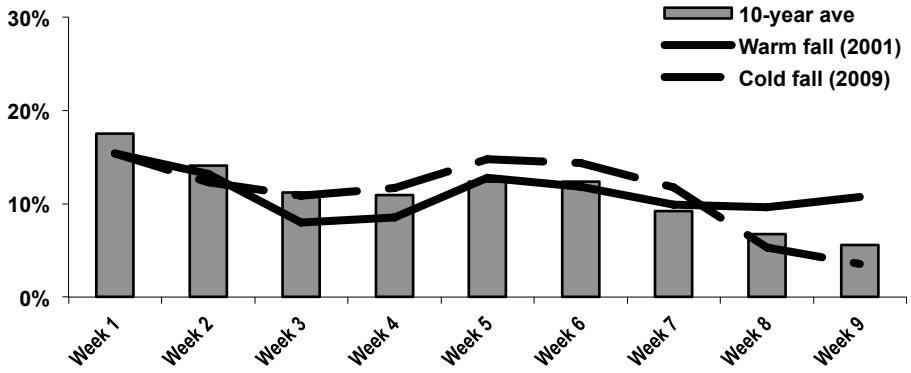
Average daily harvest per week in St. Charles County based on FWS harvest estimates: 1997-2009.



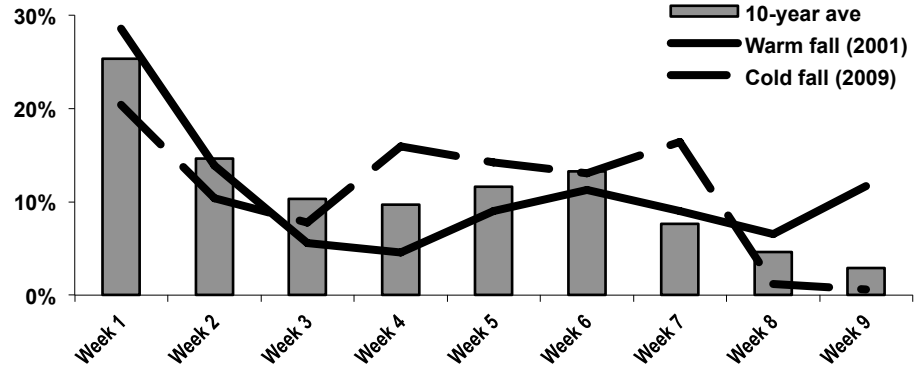
Average daily band recoveries per week in St. Charles County: 1997-2009 (n=909).



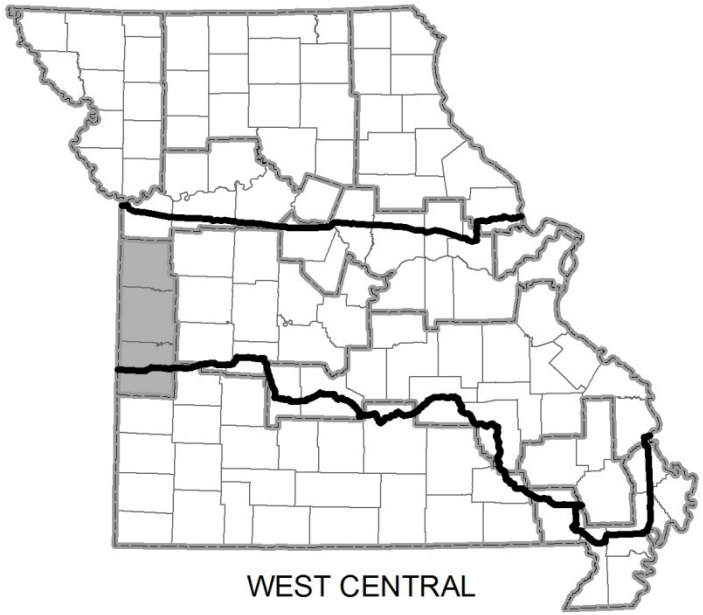
Percent of CA daily hunter trips by week of season at B.K. Leach CA: 2000-2009.



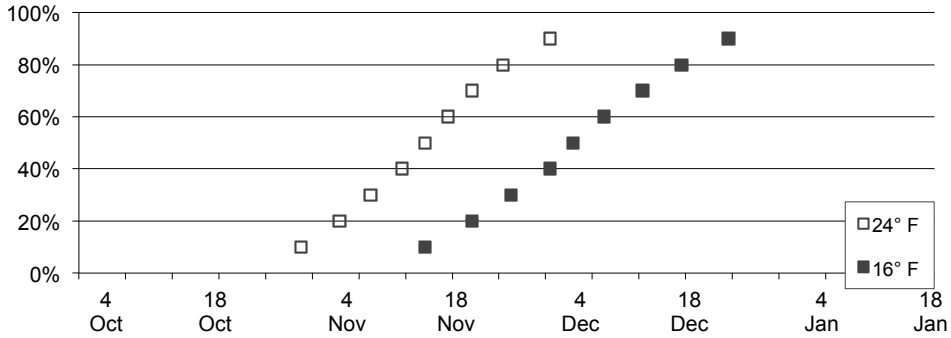
Percent of CA daily harvest by week of season at B.K. Leach CA: 2000-2009.



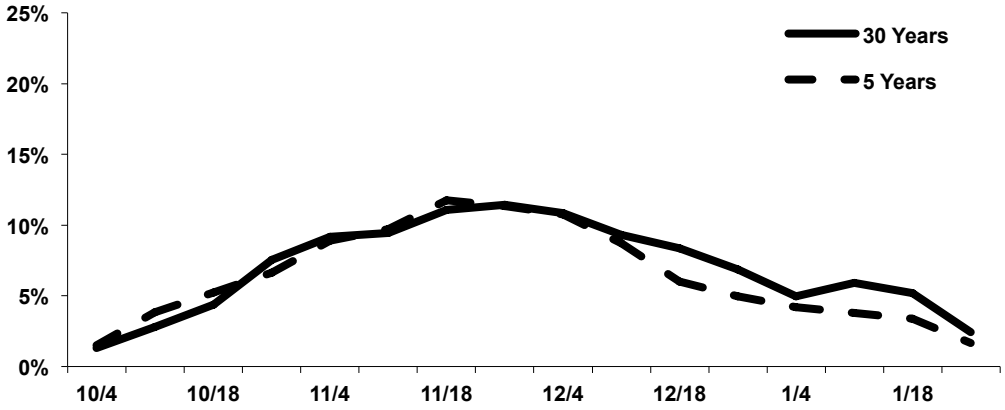
WEST-CENTRAL: Higher mean precipitation is sustained later into the fall in West-Central Missouri than in the North, and average low temperatures occur a few days later. A 50% probability of seeing a low temperature of 24° F occurs by November 14, and a 50% chance of 16° F occurs on December 3. During the past four years, Four Rivers CA and Schell-Osage were frozen an average of nine to ten days each season. Data from Schell-Osage CA and Four Rivers CA indicate the pattern of total duck use during the past five years is similar to the long-term average. A sharp rise in early migrant use occurs by mid-October followed by a more gradual buildup and sustained use by mallards through December during most years.



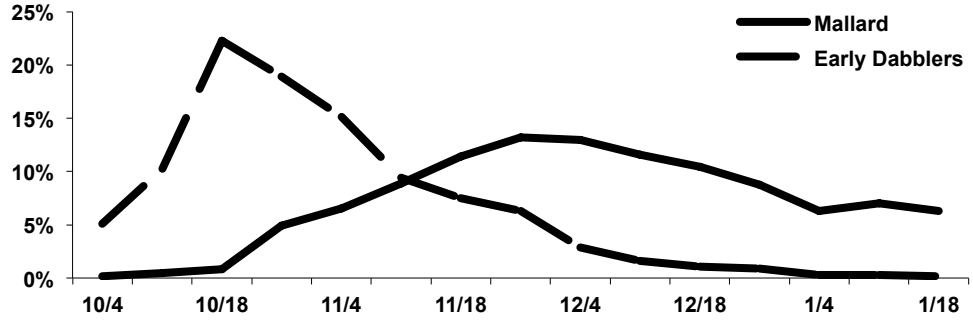
Probability (%) that a temperature of 24° F and 16° F will be reached by date at Appleton City, MO.



Percent of duck use by week (Schell-Osage CA and Four Rivers CA): 30- year average and 5-year average.

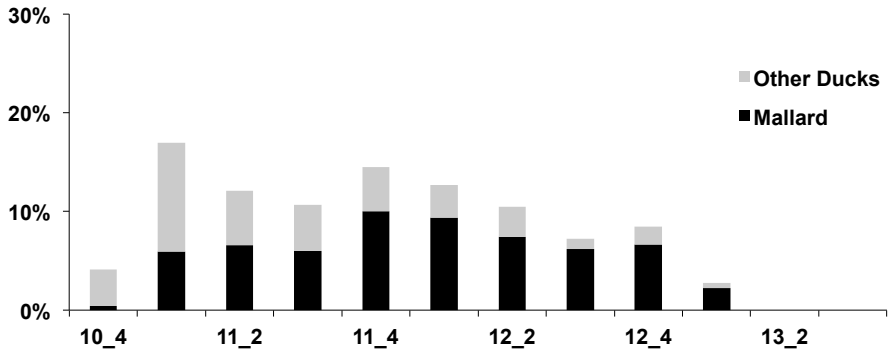


Percent of mallard and early migrant use by week (Schell-Osage CA and Four Rivers CA): 30-year average.

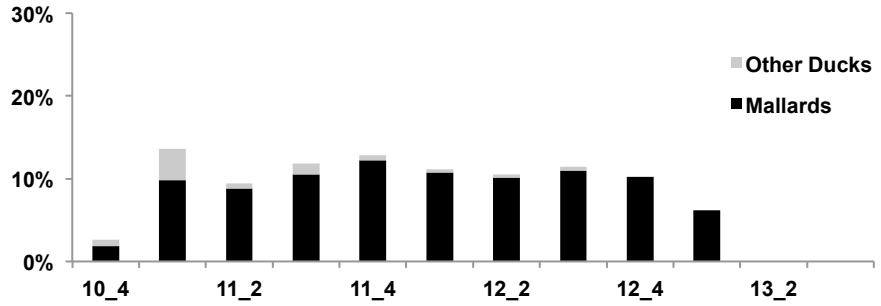


WEST-CENTRAL HARVEST: The West-Central Region accounted for 9% of the statewide FWS harvest estimate and 10% of statewide band recoveries during 1997-2009. FWS harvest estimates, band recoveries, and harvest data from Schell-Osage and Four Rivers suggest that the highest harvest occurs early in the season followed by another smaller peak in late November. The first period coincides with the peak of early migrants whereas the second period coincides with arrival of mallards as indicated by the fact that early dabblers comprised 69% and mallards comprised 31% of the harvest during the first week of November. A shift in species composition occurs throughout November with mallards accounting for 66% and other ducks accounting for 33% of the total harvest by the last week of November. Although not as predictable as in North Missouri, harvest in this region can also be affected by freeze-up during late season.

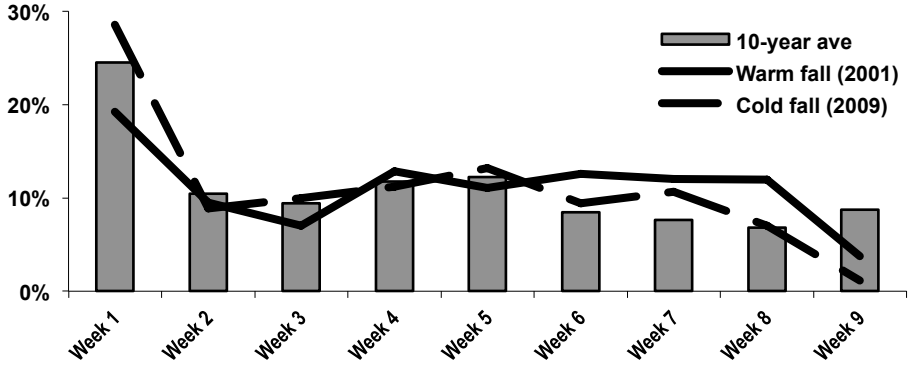
Average daily harvest per week in the West-Central Region based on FWS harvest estimates: 1997-2009.



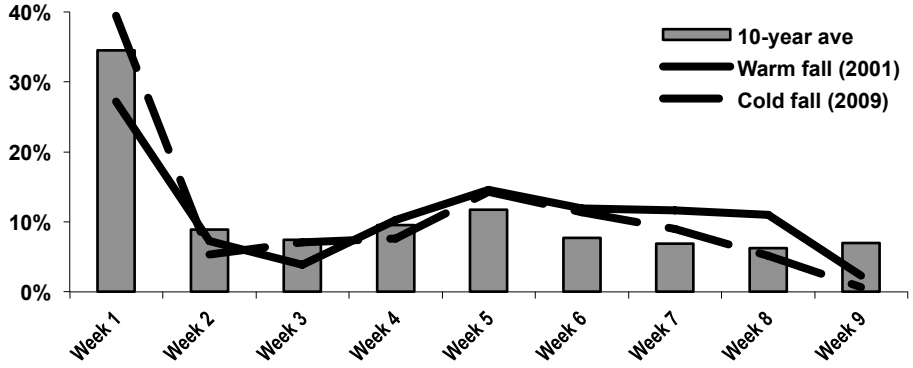
Average daily band recoveries per week in the West-Central Region: 1997-2009 (n=790).



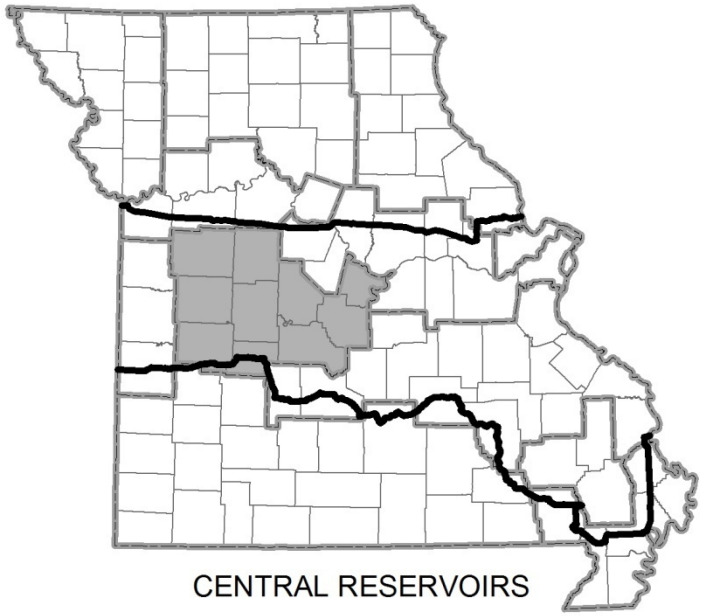
Percent of CA daily hunter trips by week of season at Schell-Osage CA and Four Rivers CA: 2000-2009.



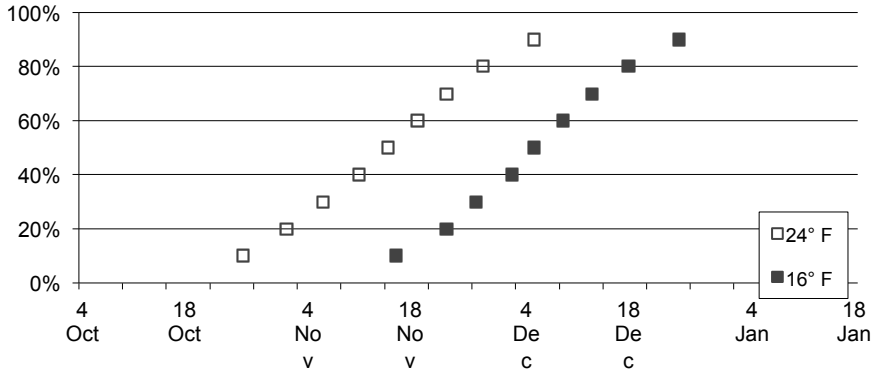
Percent of CA daily harvest by week of season at Schell-Osage CA and Four Rivers CA: 2000-2009.



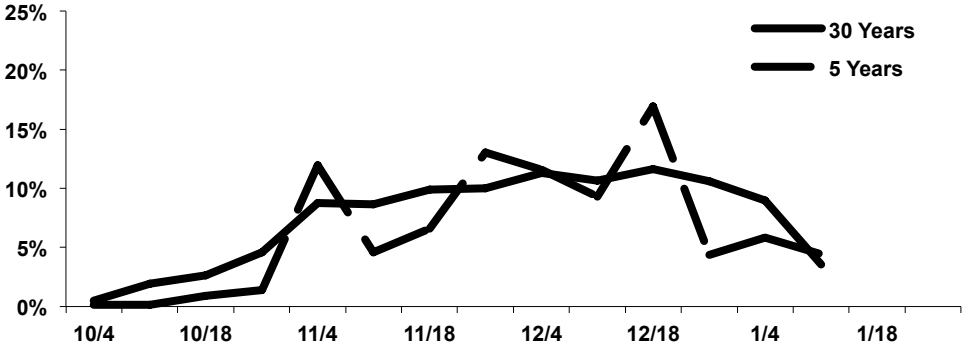
CENTRAL RESERVOIRS: Following a decline in average monthly precipitation from September, rainfall amounts are relatively consistent through November. Mean low temperatures are similar to West Central Missouri, but reservoirs and the Osage River consistently provide open water during late season. A 50% probability of seeing a low temperature of 24° F occurs by November 15, and by December 5 there is a 50% chance of seeing a minimum temperature of 16° F. Duck use builds gradually and is sustained through December into early January. Variation in the 5-year average is likely more related to duck movements to and from Montrose CA due to freeze/thaw conditions rather than general migration patterns of ducks into the region.



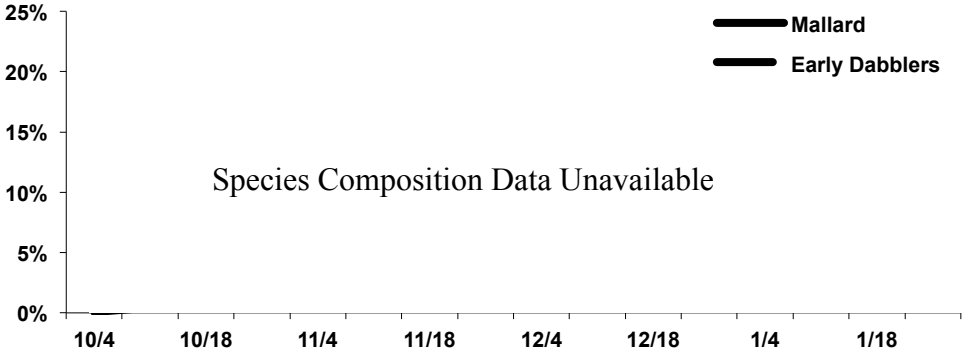
Probability (%) that a temperature of 24° F and 16° F will be reached by date at Eldon, MO.



Percent of duck use by week (Montrose CA): 30- year average and 5-year average.

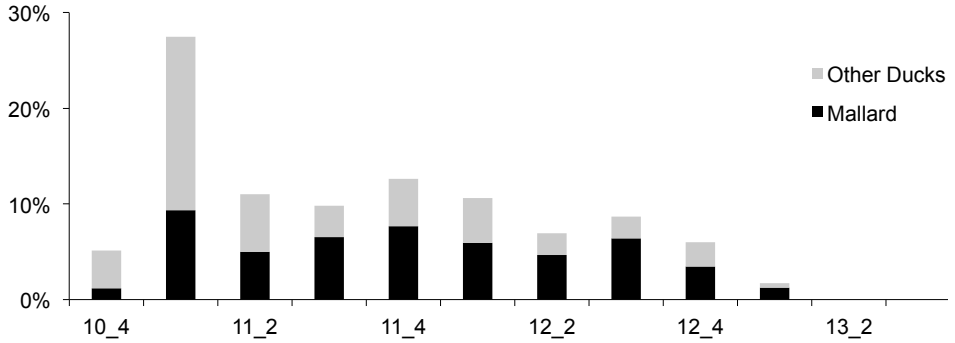


Percent of mallard and early migrant use by week (Montrose CA): 30-year average.

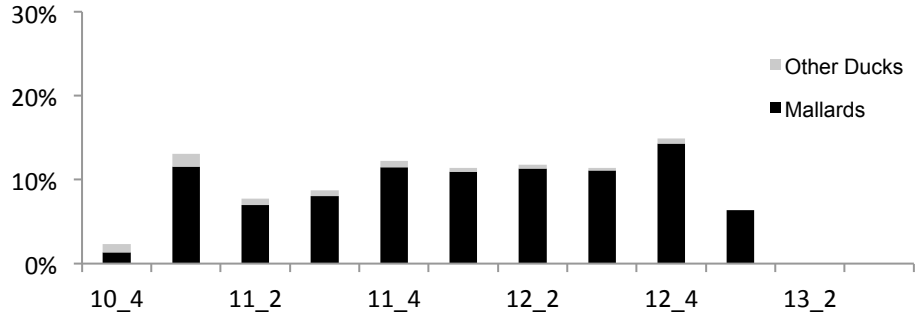


CENTRAL RESERVOIRS HARVEST: This region accounted for 10% of the statewide FWS harvest estimate and 8% of statewide band recoveries from 1997-2009. Nearly 30% of the harvest from 1997-2009 occurred during the first week of November. This early season peak in harvest is partially the result of increased hunter effort during the opening week of season. Already by the first week November, harvest included approximately 33% mallards. Harvest and hunter effort at Montrose in 2009 compared to Conservation Areas with only shallow water highlights the differences in hunter effort and harvest patterns between shallow water and deep water habitat. In 2009, most shallow water froze up by early December. Hunting effort and success was maintained during this time at Montrose, whereas most shallow water hunting had ended.

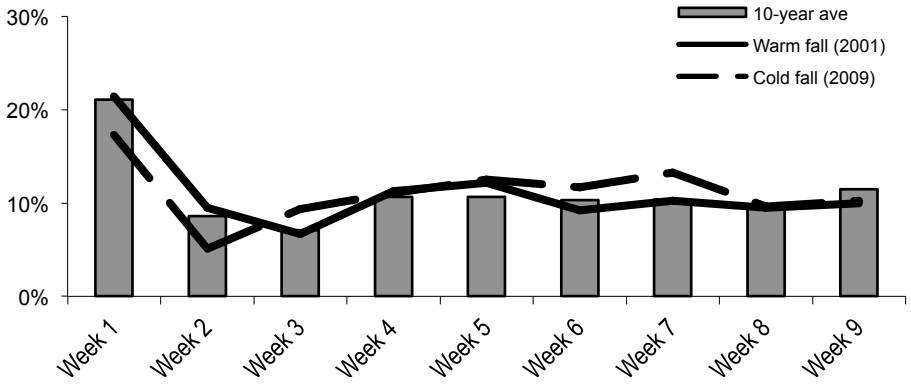
Average daily harvest per week in the Central Reservoirs Region based on FWS harvest estimates: 1997-2009.



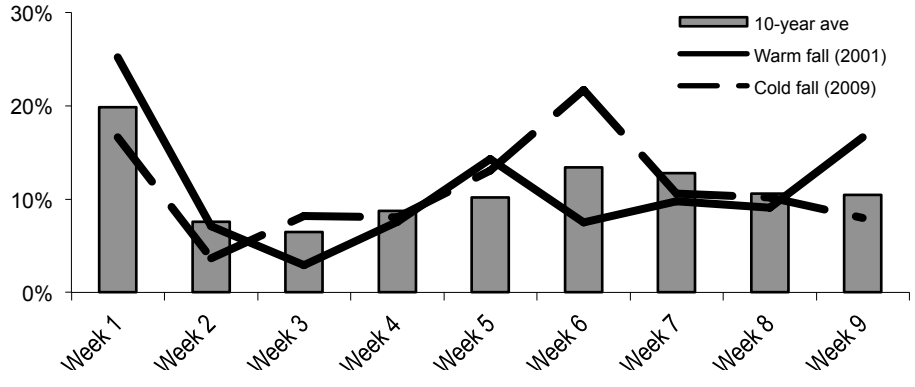
Average daily band recoveries per week in the Central Reservoirs Region: 1997-2009 (n=663).



Percent of CA daily hunter trips by week of season at Montrose CA: 2000-2009.

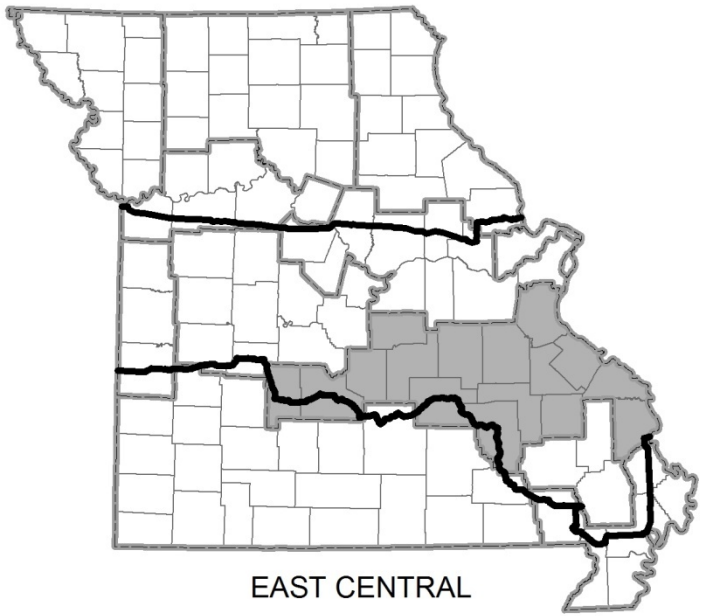


Percent of CA daily harvest by week of season at Montrose CA: 2000-2009.

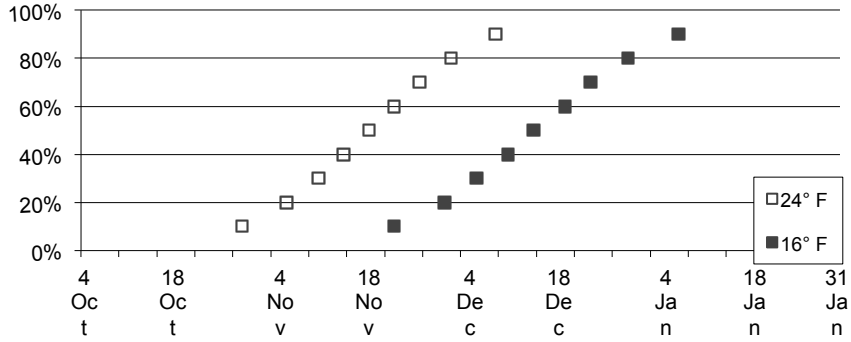


EAST-CENTRAL: The trend of sustained precipitation into the fall is apparent in East-Central Missouri. On average, there is little change from early fall through early December. Although backwaters and floodplain depressions freeze by mid-December, rivers remain open through December in most years. There is a 50% probability of seeing a temperature as low as 24° F by November 18, and 16° F by December 14.

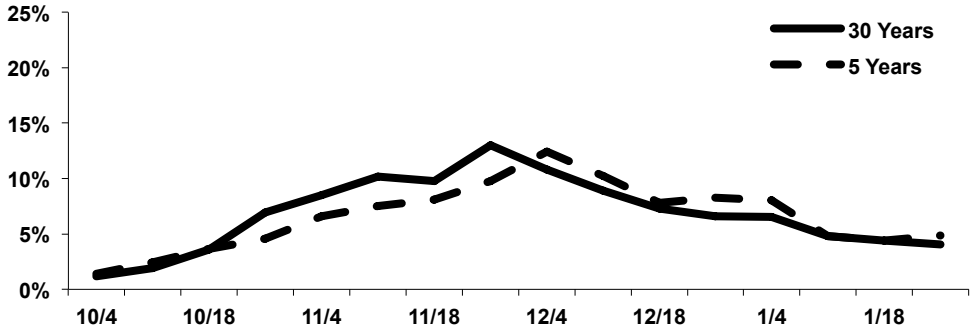
There are no managed wetland areas in this area so population data from Duck Creek, Otter Slough and Mingo are shown to reflect the general pattern of use. However, the lack of managed areas and suitable duck habitat limits sustained duck use throughout the area.



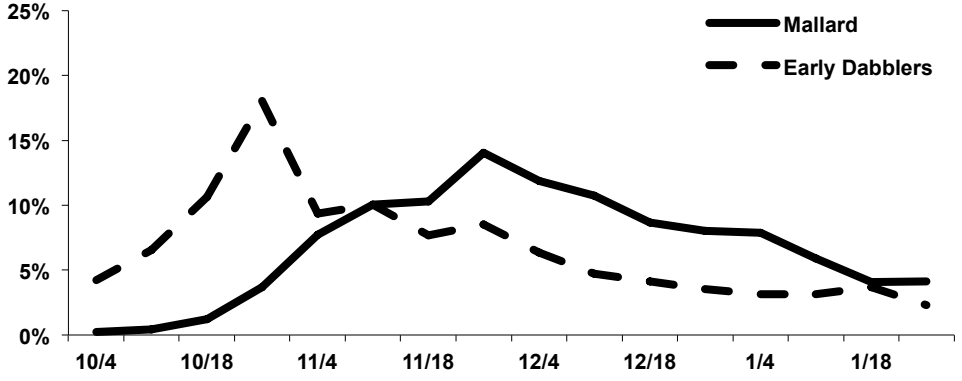
Probability (%) that a temperature of 24° F and 16° F will be reached by a certain date at Cape Girardeau, MO .



Percent of duck use by week (Duck Creek CA, Otter Slough CA, and Mingo NWR): 30- year average and 5-year average.

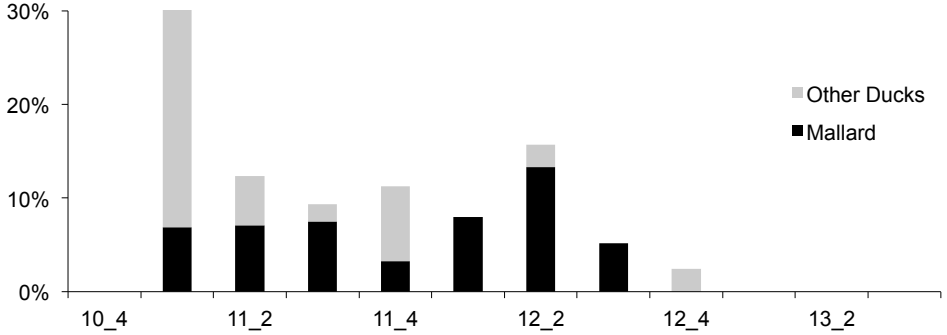


Percent of mallard and early migrant use by week (Duck Creek CA, Otter Slough CA and Mingo NWR): 30-year average.

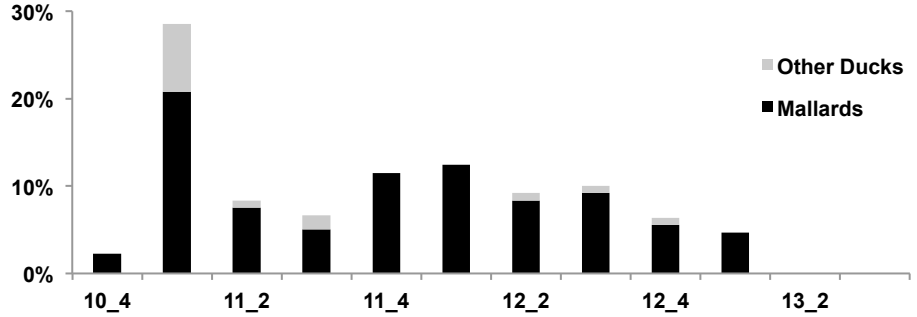


EAST-CENTRAL HARVEST: This region accounted for less than 1% of the statewide FWS harvest estimate and 1% of statewide band recoveries during 1997-2005. Harvest is likely limited to wood ducks and early season migrants during the early season with some mallards later in the season.

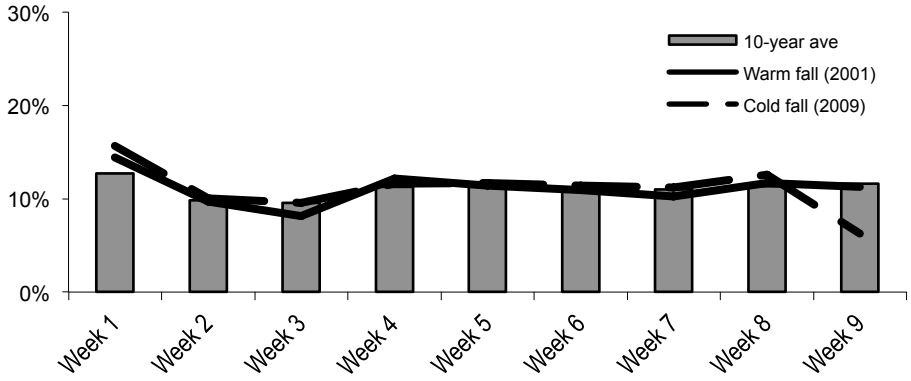
Average daily harvest per week in the East-Central Region based on FWS harvest estimates: 1997-2009.



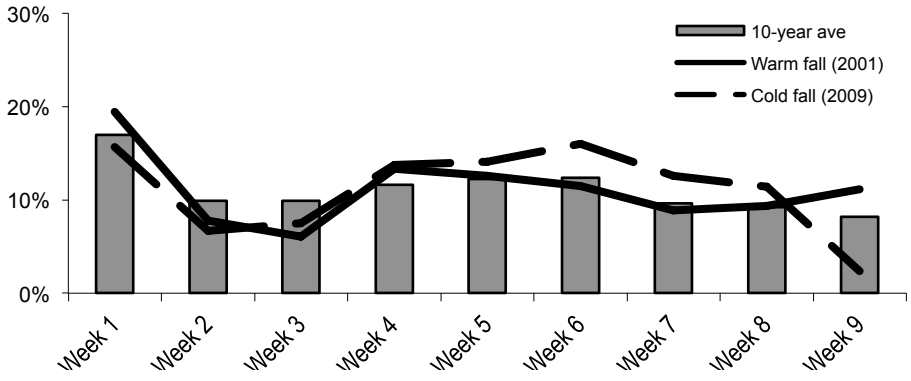
Average daily band recoveries per week in the East-Central Region: 1997-2009 (n=89).



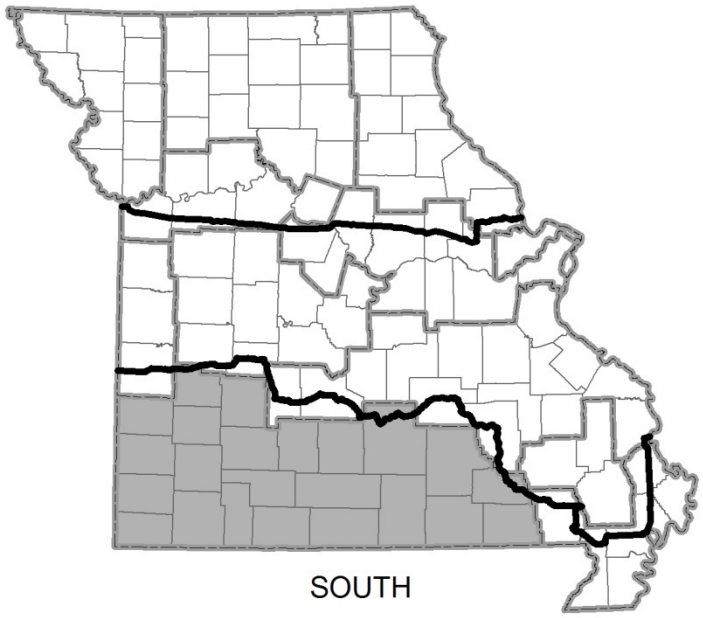
Percent of CA daily hunter trips by week of season at Duck Creek CA and Otter Slough CA: 2000-2009.



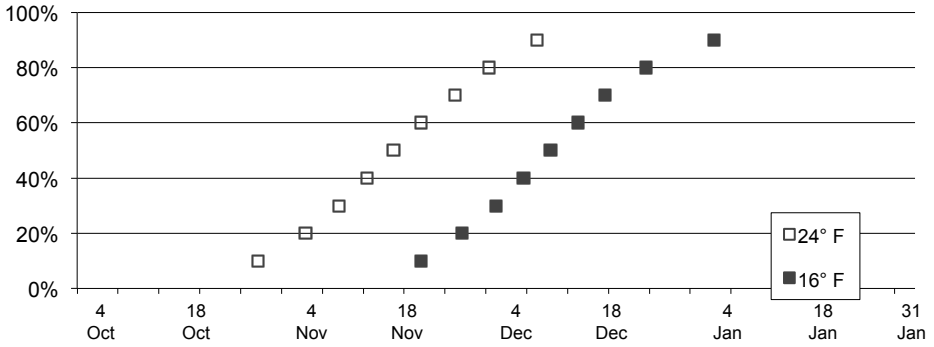
Percent of CA daily harvest by week of season at Duck Creek CA and Otter Slough CA: 2000-2009.



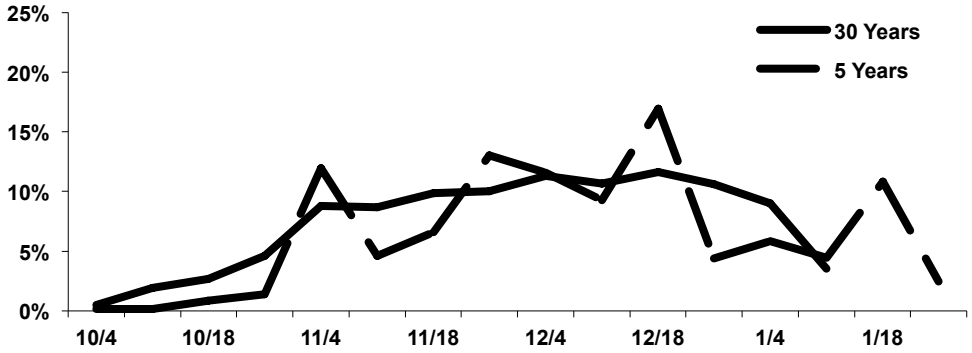
SOUTH: Average precipitation declines in this area from early fall through winter, although September rainfall generally is greater than North Missouri. There is a 50% probability of the temperature falling as low as 24° F by November 16 and dropping to 16° F by December 9. No long-term migration or population data are available for this portion of Missouri; therefore, information from Montrose CA, a deep water reservoir to the north, is used to reflect expectations for duck availability. Shallow water wetlands are found mostly in prairie areas (north and western parts) of this area. Otherwise deep reservoirs, irrigation lakes and rivers provide late season habitat for ducks. Populations of ducks, mallards in particular, remain well into the winter as long as open water and food are available.



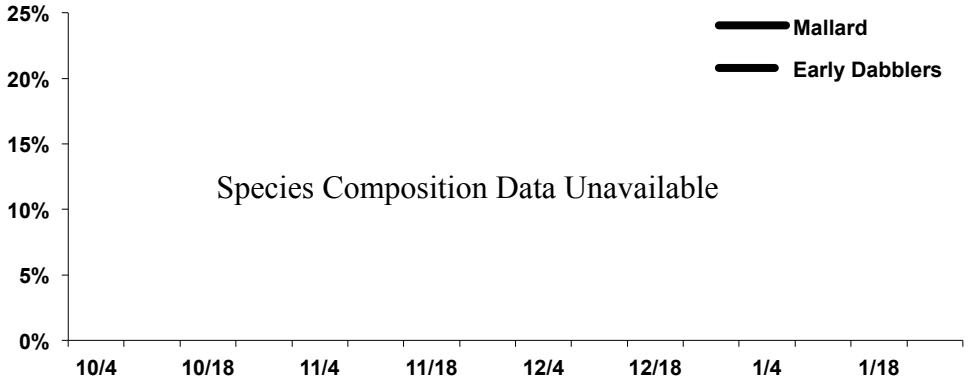
Probability (%) that a temperature of 24° F and 16° F will be reached by date at Joplin, MO.



Percent of duck use by week (Montrose CA): 30- year average and 5-year average.

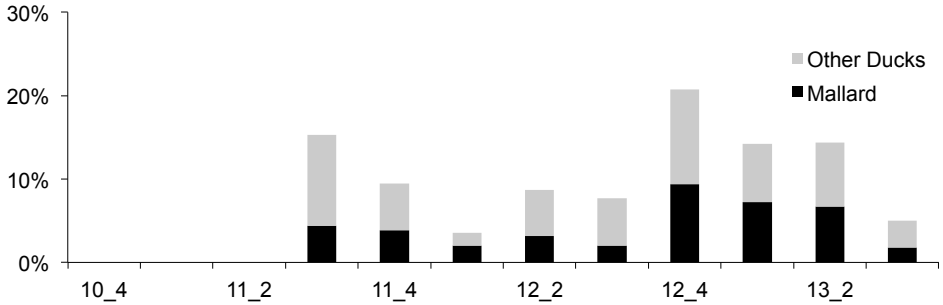


Percent of mallard and early migrant use by week (Montrose CA): 30-year average.

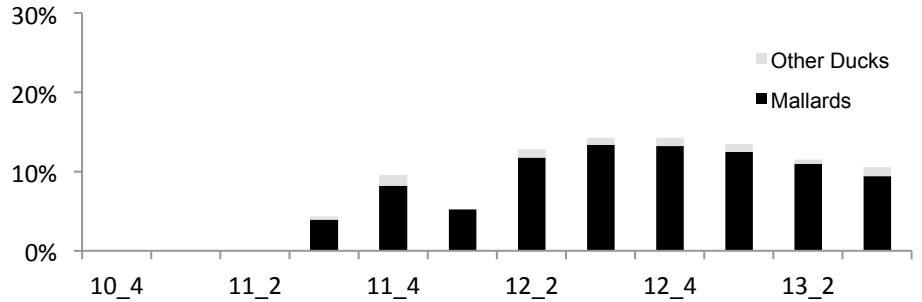


SOUTH HARVEST: South Missouri accounted for 5% of the statewide FWS harvest estimate and 5% of statewide band recoveries during 1997-2009. FWS harvest estimates suggest a peak in mid-November followed by a second peak in late December. Band recoveries suggest more consistent and better hunting during late season.

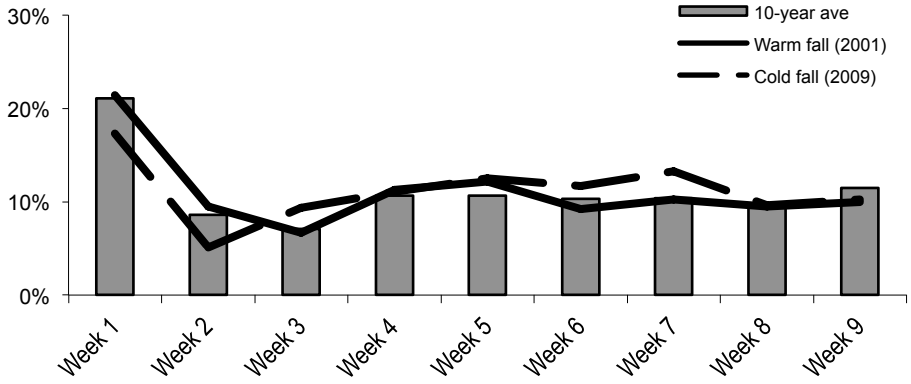
Average daily harvest per week in the South Region based on FWS harvest estimates: 1997-2009.



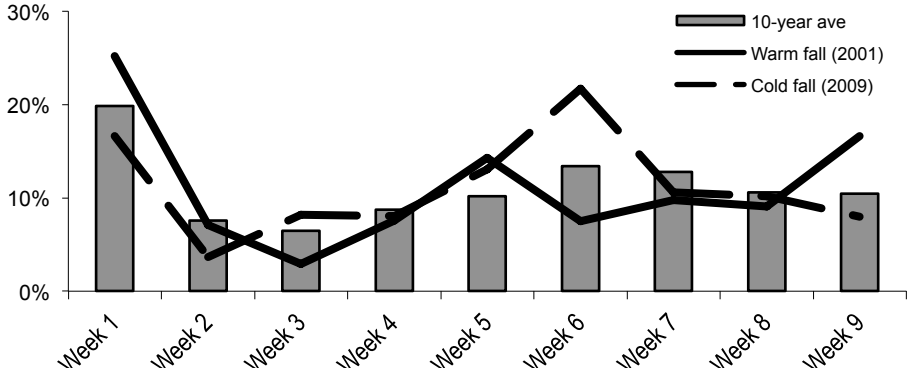
Average daily band recoveries per week in the South Region: 1997-2009 (n=425).



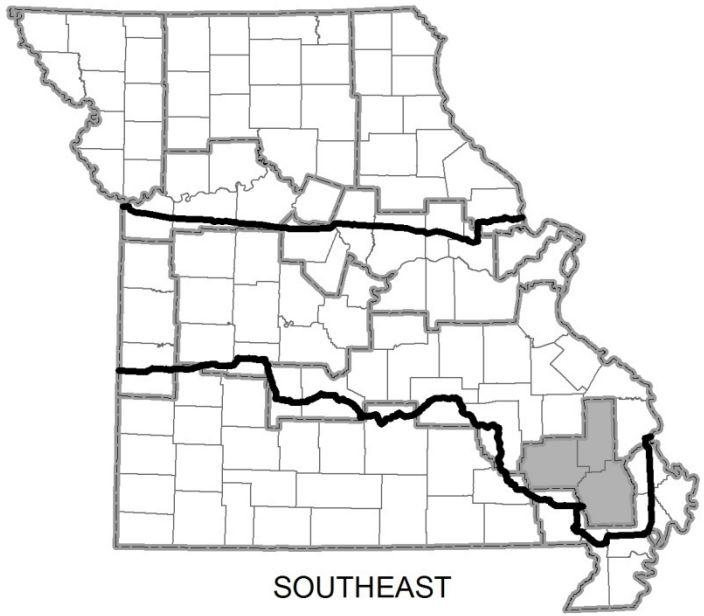
Percent of CA daily hunter trips by week of season at Montrose CA: 2000-2009.



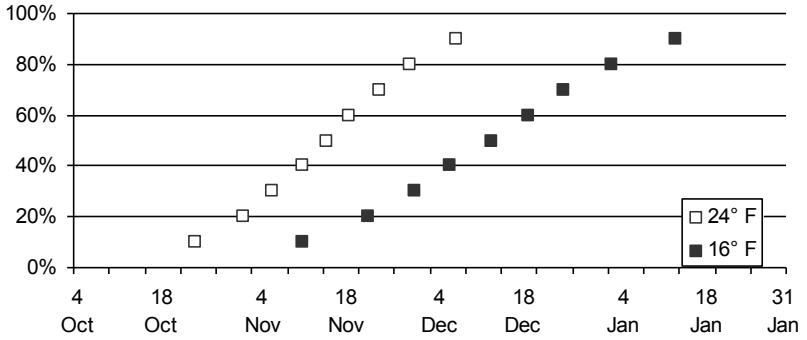
Percent of CA daily harvest by week of season at Montrose CA: 2000-2009.



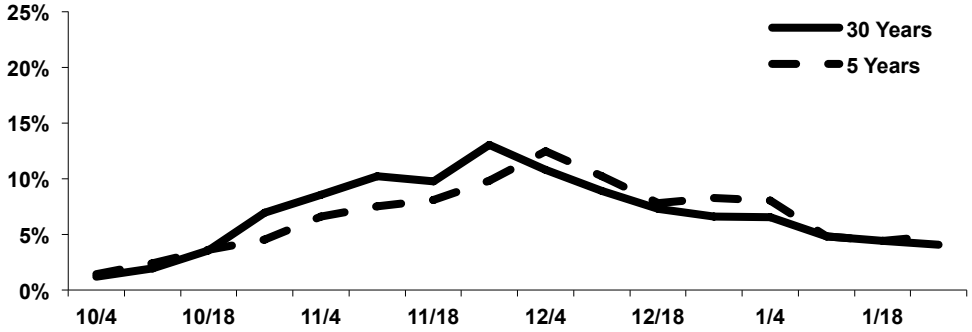
SOUTHEAST: Dry conditions normally prevail through early fall compared to North Missouri. However, increased precipitation occurs during November and December. With increased rainfall and temperatures that remain mild into December, ice conditions do not normally become a factor until after mid-December. Late fall rains can also provide more shallow water habitat and flood green tree reservoirs. However, this newly created late season habitat can also be prone to freeze-up. During the past four years, wetlands at Duck Creek CA and Otter Slough CA have been ice-covered for an average of five to six days per season. A 50% probability for a low temperature of 24° F occurs by November 15 and for a low of 16° F by December 13. A 90% probability of seeing a temperature of 16° F does not occur until January 13, but this is still nearly 2 weeks earlier than Portageville. Duck numbers build steadily through mid-November then decline through December and early January. Duck use patterns are relatively similar between the last five years and the long-term average although the five year average of duck use peaked slightly later than the long-term average. Early migrants peak during mid-October to early November.



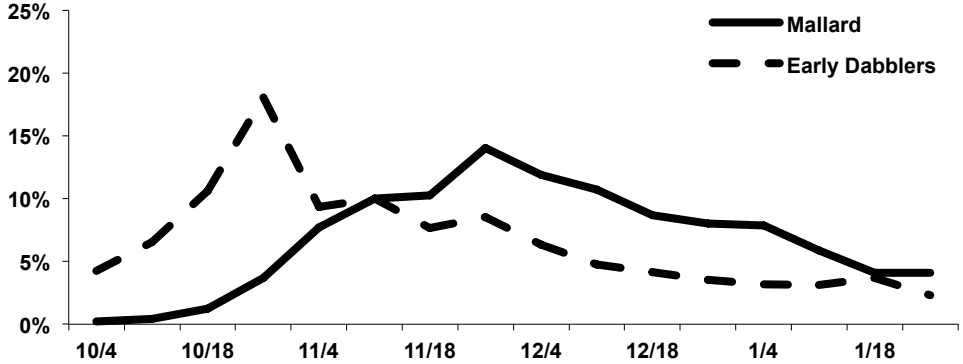
Probability (%) that a temperature of 24° F and 16° F will be reached by date at Advance, MO.



Percent of duck use by week (Duck Creek CA, Otter Slough CA, and Mingo NWR): 30- year average and 5-year average.

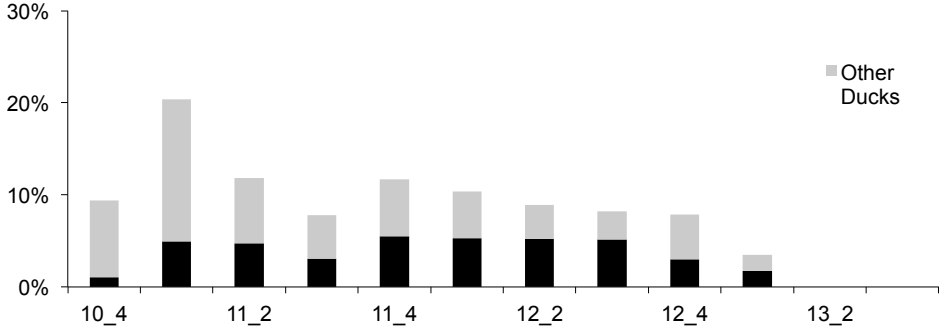


Percent of mallard and early migrant use by week (Duck Creek CA, Otter Slough CA, and Mingo NWR): 30-year average.

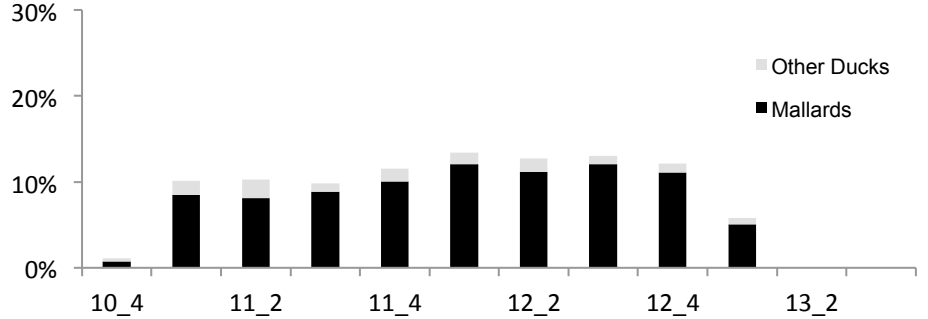


SOUTHEAST HARVEST: Southeast Missouri accounted for 10% of the statewide FWS harvest estimate and 11% of statewide band recoveries during 1997-2009. Approximately 20% of the harvest in this region occurs during the first week of November according the FWS estimates. Large harvest early likely reflects a high level of hunter effort associated with opening weekend, and relative high numbers of early migrant ducks present when the season opens. This is reflected in the species composition as early migrants comprise 66% of the total harvest during the first week in November. During the remainder of the season, harvest is fairly stable with the ratio of mallards to other ducks approximately 50-50. Although the impacts of cold or mild weather are not as severe in this region compared to North Missouri, shallow water freeze-up can still cause a decline in harvest as indicated by the harvest patterns at Duck Creek and Otter Slough in 2009 (a cold year) in which a sharp decline in harvest occurred the last week of the season versus 2001 (a mild year) in which harvest remained relatively stable throughout the season.

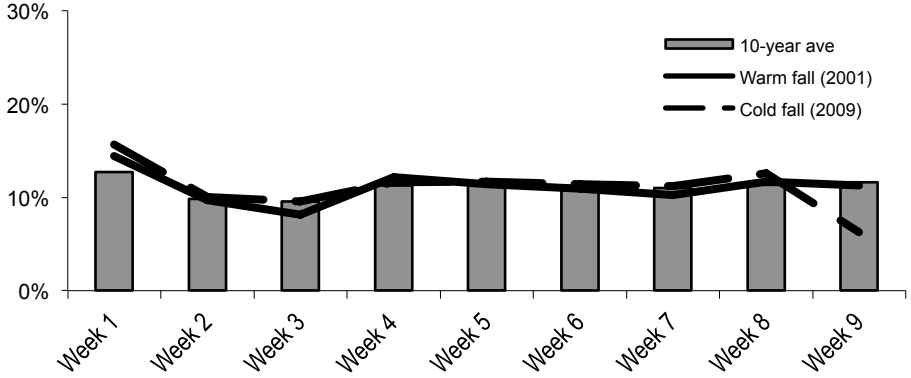
Average daily harvest per week in the Southeast Region based on FWS harvest estimates: 1997-2009.



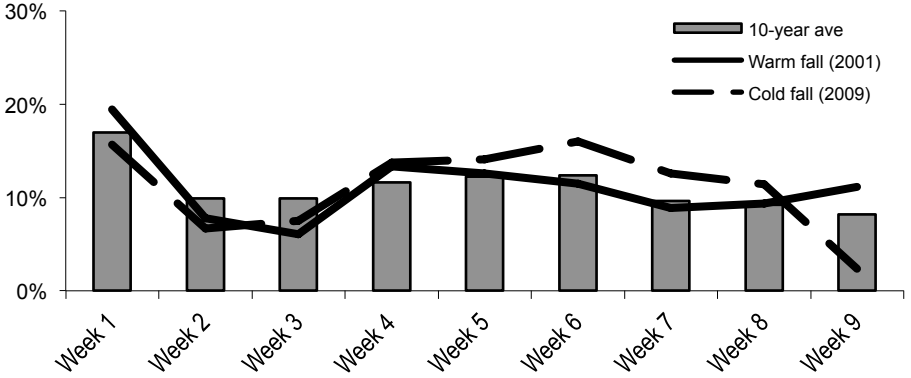
Average daily band recoveries per week in the Southeast Region: 1997-2009 (n=914).



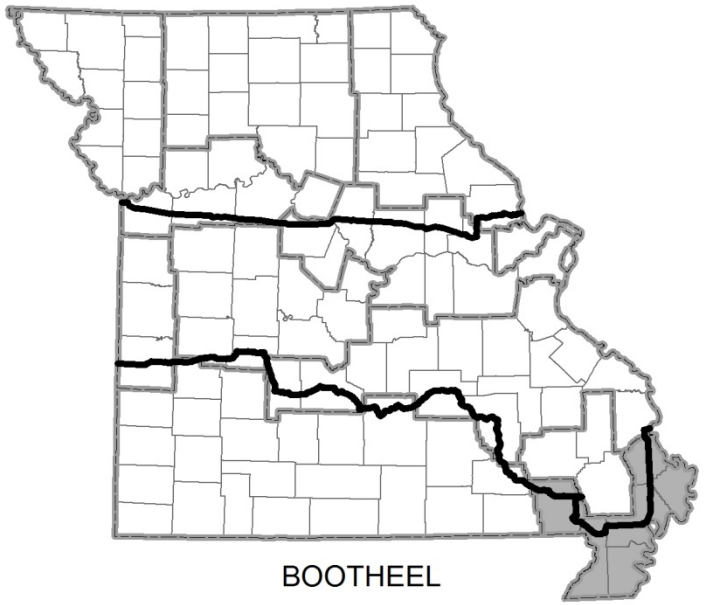
Percent of CA daily hunter trips by week of season at Duck Creek CA and Otter Slough CA: 2000-2005.



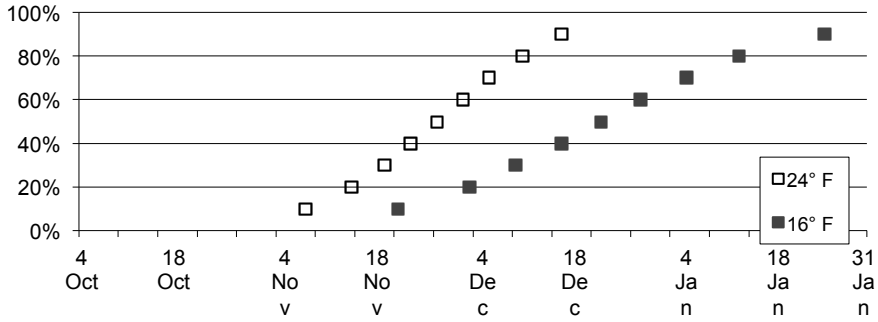
Percent of CA daily harvest by week of season at Duck Creek CA and Otter Slough CA: 2000-2009.



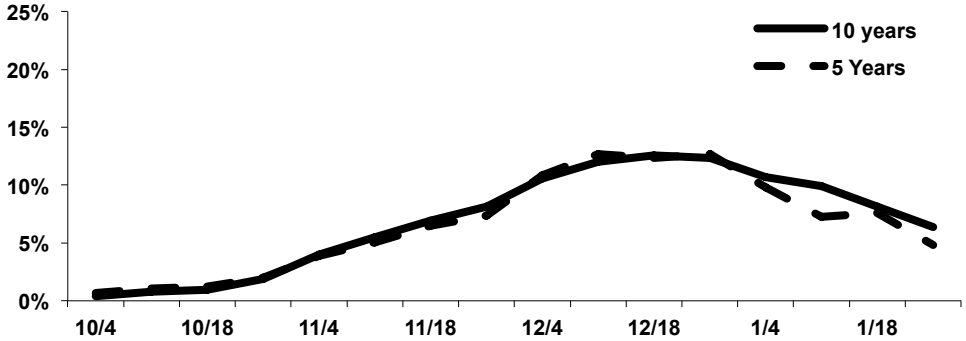
BOOTHEEL: Precipitation patterns reflect the late fall and early winter flooding potential in the Missouri Bootheel. Conditions are normally dry during early fall but rainfall increases in November and December. A 50% probability of seeing a temperature as low as 24° F occurs by November 27, a 50% chance of seeing 16° F does not occur until December 22, and a 90% chance of 16° F does not occur until January 25, nearly 2 weeks later than the Southeast area. Duck use patterns differ from most other areas in Missouri. Late fall and early winter rainfall create "increasing" food availability in wetlands and freeze-up, if it occurs at all, is of short duration. However, during the last four years, wetlands at Ten Mile Pond have been frozen-up for an average of nearly 10 days each season. If forced to leave, ducks often move a short distance only and may return in a few days. A comparison of ten-year and five-year data is shown for Ten Mile Pond CA due to its relatively recent development date. Peak use occurs during December and through mid-January.



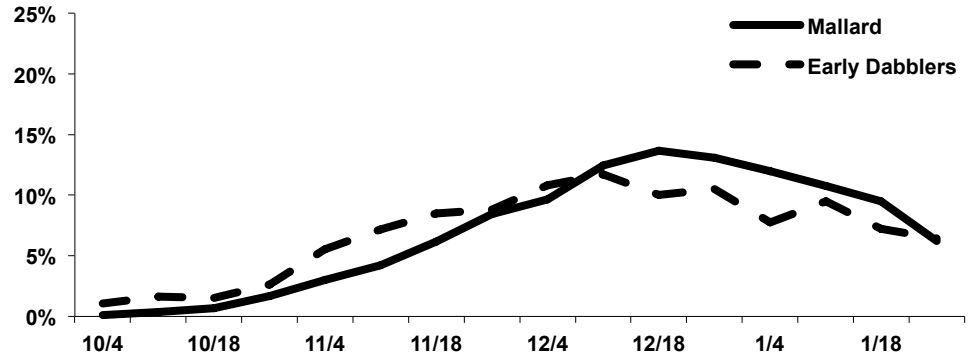
Probability (%) that a temperature of 24° F and 16° F will be reached by date at Portageville, MO.



Percent of duck use by week (Ten Mile Pond CA): 10- year average and 5-year average.

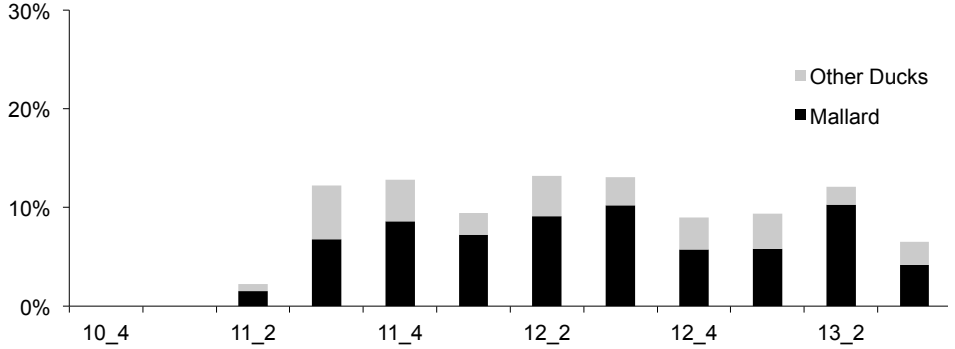


Percent of mallard and early migrant use by week (Ten Mile Pond CA): 10-year average.

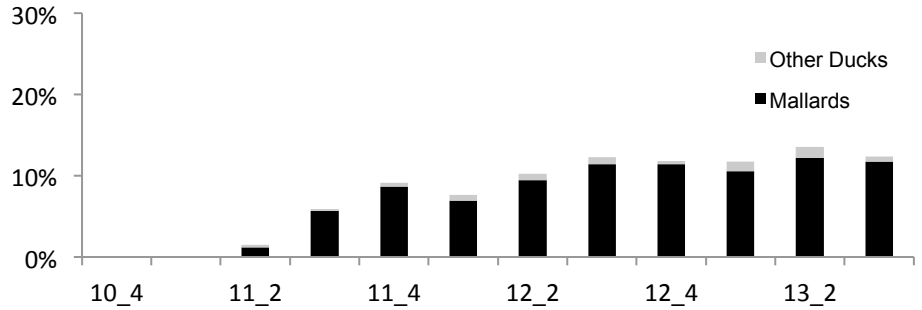


BOOTHEEL HARVEST: The Bootheel accounted for 8% of the statewide FWS harvest estimate and 13% of statewide band recoveries from 1997-2009. Compared to all other regions of Missouri, the Bootheel has the most consistent hunting from the start through the end of season; however, the season opens after many early season migrants have departed Missouri. From a statewide perspective, peak mallard migrations typically occur during the last two weeks of November and the first two weeks of December. Depending on the year, these major migration events may occur before the South Zone season begins and reduce the possibility of hunting "flight days." On the other hand, more habitat is often available later in the season as this is normally a wetter period. Opportunity for late season success is also made possible as birds redistribute in response to freeze/thaw conditions. This is the only region in which mallards comprise the majority of the weekly harvest throughout the season.

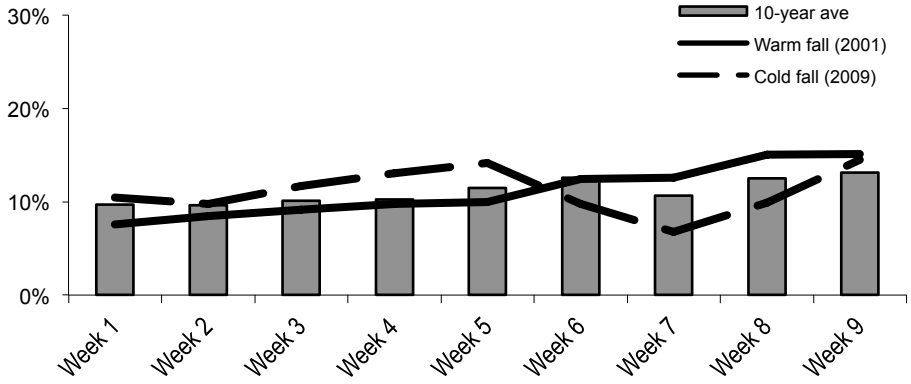
Average daily harvest per week in the Bootheel Region based on FWS harvest estimates: 1997-2009.



Average daily band recoveries per week in the Bootheel Region: 1997-2009 (n=1,085).



Percent of CA daily hunter trips by week of season at Ten Mile Pond CA: 2000-2009.



Percent of CA daily harvest by week of season at Ten Mile Pond CA: 2000-2009.